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J. E. WILLIAMS, EDITOR.

THE SOUTHERN PLANTER

DEVOTED TO

AGRICULTURE, HORTICULTURE,

AND THE

HOUSEHOLD ARTS.

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CONTENTS.

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Devoted to Agriculture, Horticulture, and the Household Arts.

Agriculture is the nursing mother of the Arts. [XENOPHON.

Tillage and Pasturage are the two breasts of the State.—SULLY.

J. E. WILLIAMS, EDITOR. AUGUST & WILLIAMS, PROP'RS.

VOL. XIX. RICHMOND, VA., FEBRUARY, 1859. NO. 2.

For the Southern Planter.

Sorghum and other Substitutes for Blade Fodder.

MR. EDITOR:

In your December number I observe an article from a correspondent giving his experience in making molasses from Chinese Sugar Cane; and in a number preceding that by two or three months, I notice that another gentleman—I forget in what connection—expresses a willingness to give up fodder pulling, in case an equivalent can be suggested. I have some remarks to make on both these subjects, which I shall proceed to at once, suggesting to one gentleman what, with deference, I think a better purpose to which he may apply Chinese Sugar Cane, and to the other, several equivalents for blade fodder.

First. As to the manufacture of molasses from Chinese Sugar Cane. Admitting, argumentatively, that it will pay at the present prices, we have no guarantee of that price for any protracted period, and in the face of much competition, but rather good reason to expect a serious deduction: good enough at least to forbid the substitution of molasses for tobacco, which the comparison of your first named correspondent would insinuate. If it be possible to make it at the same profit that attends tobacco making, so many persons who do not make tobacco will make molasses that it will soon come down to the level of general prices, and will not be more profitable than other crops. But probably before that period will have been reached, the fall will have commenced in another and more influential quarter; to wit—the sugar countries. In them molasses is not a direct product, but a mere result or incident of the production of sugar. It is therefore almost of the nature of a spontaneous product, and is furnished, thus incidentally, in vast quantities. In British Guiana, which makes sugar for nine months of the year; in Cuba, which, I think, is engaged in the same process (of manufacturing sugar, not growing the cane,) for six months of the year; and in Louisiana, which, being able to devote only three months of the year to the same purpose, has found it necessary to invoke an import duty in aid of her competition with foreign countries; in all these it is evident that molasses, the mere drippings of their hogsheads, can be sold far more cheaply than by us, cultivating for the direct purpose, a plant whose aptness for that purpose is confined to a shorter period, at a time, which, with most farmers or cultivators of mixed crops, is otherwise fully occupied. Molasses is often sold in Havanna at

12½ cents the gallon, and sometimes, I think, lower than that: freights and tariffs bring up the prices to what we have to pay But if we or the Yankees, (who, as I do not love them, I hope will try it,) shall attempt to raise our molasses at home, I think we shall soon see the effect of capital and skill when brought to bear on the cider mills and bacon pots which we array against them. Within the last twelve months I have seen that Maunsel White, of New Orleans, owns a sugar plantation worth about $800,000; Mr. Preston, of the same State, sold his plantation to another merchant of New Orleans for one million; the late Mr. H. Browse Trist left one which brought about $357,000; and two others belonging to his family connections brought, the one over $500,000, and the other over $300,000. From my own observation in that country, I incline to believe that the sugar plantations of Louisiana average over $100,000 in value—slaves, stock and all. Can we, with our diversified culture, compete at such odds in capital against climate, unsurpassed fertility of soil, and undivided attention to one staple? I think not. But still we can make something out of Chinese Sugar Cane. And this brings me:

Second. To remark upon the proposed substitutes for blade fodder. With their inveterate antipathy to change, which, with no matter how many exceptions, is the characteristic, and generally a wise one, of our farmers, too many of them eschew the practice of feeding work horses on green food. Hot weather, as the idea runs, requires dry food. I beg leave to express a different opinion. In Cuba, where it is "hot" enough, Indian corn grows very large and luxuriant stalks, but does not make a good ear. They grow it there as the common food of their horses, and it is fed to them green. The horses are quite small, but well formed and remarkably hardy. They ride there no other kind but stallions, whose only gait is a walk and a gallop. These stallions, I have been assured by Mr. Nicholas P. Trist, sometime Consul at Havanna, will take a heavy rider sixty miles a day in a gallop, without injury or undue fatigue. Now, as I learn by the same authority, they are fed mainly, if not entirely, on green corn-stalks and blades—a succession being cultivated for the purpose. The beautiful mules which draw their long-shafted and cumbrous *volantés*, a sort of double gig, the only pleasure vehicle of the country, worked by one horse, the driver mounted on his back, and three persons in the *volanté*, these mules, which our own people admire so much as of foreign growth, when in fact they are the pick of Kentucky and Tennessee, get scarcely any other food than the same green corn, and no other grooming than a daily swim in the waters of the harbour. But they keep fat.

So the horse of the Guacho of Buenos Ayres, ever on the gallop, traverses the vast Pampas, getting green clover for one hundred and eighty miles and green grass for four hundred and fifty miles more, and Heaven knows what for the remaining three hundred miles of bush. So the horses of California, (whether they *do* now or not, I cannot say,) did their work on the green grass of the plains until the proper season turned it to hay, in which state it lay until the rains of winter spoiled it. A very intelligent returned Californian, who kept a livery stable at one time in some of their cities, told me that his horses underwent much of their service on this fare: and on my asking him if our horses could stand it, said: "Oh, yes, as soon as they get used to it. The best horse in my stable was a blooded mare from the States: one that I took out over the plains from St. Louis." And how do any horses live on those plains except upon grass? What other food can our dragoons get? How can a Santa Fe trader obtain dry food? Who ever heard of that American Arab, or that modern Centaur,t he Camanche, raising food for *his* horse.

I have grouped these cases, Mr. Editor, which are stronger even than my position requires, to shew that the thing has been done systematically, and of necessity, and to engage attention by citing striking cases, rather than from any want of instances at home, which, simply because they *are* at home, may not be deemed so conclusive. I will state two of them. Last fall I was at the house of a friend in the Upper Country. His horses—four plough teams of three each—were just concluding a clover fallow, every foot of which had been broken up in the drought. They had cultivated in all other forms of horse work a large plantation—some twelve hundred acres; and they had eaten no corn, except a mid-day meal, of a few ears, from the first of May. Working at it "until you could see the stars," as my friend expressed it, they were then turned out into a good pasture to remain

until day-break of the next day. Under this routine, continued until the first of October, when I saw them, they were fat, at least in fine working order. Others in the same section, under various modifications, pursued the same plan, and have done so for years. Indeed in some districts of Upper Virginia, this practice, though not universal, is yet so common, that some among them who may happen to read this article will be astonished that any one should think it necessary to recommend it or to vindicate it.

"But all people have not their good pastures," some objector will say. Very true: I am just coming to that with a bit of my own experience. A few years ago I happened to come into possession of a good grass farm—only there was no grass on it. Unlike Holkham, of which Coke said, that when he took it there was but one blade of grass on it, and two rabbits were fighting for that; there was nothing on it but water and wet clay, and the bull-frogs and crawfish were fighting for *that*. No grass there: Unless you dignify by that name the broom-straw and poverty-grass, which covered the ground, bearing to each other the same relation that the hair and the true fur do in a lady's sables, and interlaced with the creeping dew-berry. The first and second years I sowed rye and fed it green at the proper time to all my stock. The third year I managed to cut some clover, which I fed green, and I also got the privilege from an adjoining proprietor, of cutting partridge-pea on his low grounds; I fed all my stock a fortnight on that. But as my work was incessant and very hard, I fed corn along with it, but no long food except chaff and shucks at night, when fed at all. But in the season just passed I pursued a different plan; which was this: I work twelve mules. With that team, without an ox to help them, on a stiff clay farm, I manured fifty acres of land with straw and the ordinary farm manures; I hauled 4,660 bushels of lime an average haul of a mile and a half, up a steep hill, and over wretched roads, whereby I gutted the teams at the beginning of the working season. I worked 150 acres in corn, 50 in oats, and 50 in pea fallow; cut 160 acres of wheat with reapers, and threshed out 2,500 bushels of wheat with straw enough for 4000 bushels; hauled the crop four miles to market, hauled also 800 bushels of corn the same distance, and hauled 9 miles, to mill and back, logs enough for a thousand yards of plank fence. This I call good work for the team. On the first of September my corn gave out, from whatever cause it may please the reader to assign, and then with a team jaded by their work, I had to get ready for my wheat crop. That comprised 175 acres of land: the pea fallow above spoken of, twenty-five acres of corn land, twenty acres of low grounds corn, and the balance clover and weed fallow, of which about twelve acres only had then been broken. Of course such land in such a season was baked very hard. I left home to stay a fortnight, with orders to my overseer to plough the land and feed the horses on refuse wheat ground, on bran and brown stuff, with the addition of a plenty of cut oats—such oats as we all made last year on low grounds—as much seed in them as there were "reasons" in Gratiano's discourse, and very much of the same quality.

When I returned, much of the land had been ploughed with four horse teams, though it looked as rough as the sea in a cross wind; and to my utter astonishment the mules had picked up. Their hair, that most unmistakable indication, showed it at a glance. I thought it but just to congratulate my overseer and the ploughmen on the improvement, but gave some of the credit to the ground wheat. "They hav'nt had it," said the overseer, "the water has been so low that we have been glad to get meal for bread." "Then," I replied, "the brown stuff has been better this year than usual." "*That* did'nt do it, sir." "Then what did?" "That Chinese Sugar Cane. You had told me how they managed their horses in Cuba, and I thought I would try our mules in the same way. We had enough cane for the hogs, so I gave the mules a light feed or two of it. They seemed to relish it, so I gave them more. They have had nothing else to eat at night but that stuff thrown to them in the lot, and they always eat it up clean, seed and all; and they have been picking up ever since."—And so they continued to do until the Sorghum gave out. Then, the mill being still on a short allowance of water, they had to come back to bran, brown stuff and cut oats, and at once fell off. To shew the kind of work they did on this green food I will state one fact, and will begin at the top, so as not to tax the reader's credulity. I measured the largest clod I could find after a

close search. It was 30 inches long, 20 inches wide, and 6 inches thick! I found others that I thought larger; but as it was more difficult to take the dimensions of their more irregular forms I did not measure them.*

Here then, to come to the point of this egotism, is a use that Sorghum may be put to. An experiment—made at this disadvantage: that it was tried on an exhausted team—kept up that team to very heavy work, and enabled me to get in my crop of wheat, which, without this and CROSSKILL'S CLOD CRUSHER, I am convinced I could not have done. Let it then be planted for this purpose, and let gentlemen who have no clover, many of them because they will not have, try enough of it for experiment's sake, only taking care to select the stalks whose saccharine principle is developed when they cut it. This is at first the main stalk, *not* the suckers, which generally do not ripen for a week or ten days afterwards.

Some persons perhaps may not be convinced by what I have said, and will insist on it that dry food is necessary. To such I will reply, not by argument but by offering them fit substitutes for fodder. I do not mean to say a word against good blade fodder *as* blade fodder. I admit its superior value for long forage, *provided* somebody gives it to you. But I make these points against it: that from the particular mode in which alone it can be gathered and cured, pulled by hand from each stalk, and cured by bundles, it costs about twice as much labour as it is worth; and that it robs the ear of a per centage of yield equal to its own value—thus costing two prices at once: that in many places it exposes the farm hands to the most unfavourable conditions for health—night work at a period of heavy dews, whereby the force of the farmer is frequently crippled for other and much more remunerating labours; and that it is subject to more risk in curing than any other long food we make. On one or more of these four counts I think I may ask a verdict against blade fodder if I can find an adequate substitute. Let us look for this substitute.

Why do we want long food at all? Because the stomach requires distention as well as nutrition. Its vital action depends on its mechanical condition. *Therefore* we want a belly full. If hay be given, then you have distension and nutrition in the same substance; but it is not necessary that this distending food should be nutritious, provided you give a food of more concentrated nutriment along with it. I know this practically, and by observation. For eighteen years, the period of my farming pursuits, I have never pulled fodder; and my teams have been in as good order as other people's, possibly better for the work they sometimes have to do. Their long food has been given to them green in the summer, with pasturage at night when I could get it: in the fall, winter, and early spring, corn-stalks—blades and all—shucks, wheat chaff, and cut oats,—(on which food, by the way, barring the oats, I have fattened many a bullock to the top of the market, feeding grain with it, of course.)—The corn stalks have been fed to them either in their stalls, or in an open lot when practicable, and in the first part of the winter. The other kinds have been variously fed as their appetites seemed to fluctuate. The chaff may be moistened and mixed with their grain or meal, or fed separately and dry. The shucks should always be cut up, except in cold weather, one feed in advance, moistened, sometimes with salt and water, then put into a wide shallow bin, and weighted down so as to diffuse the moisture through the mass. Every body says that cattle eat shucks with a little mould on them better than they do fresh ones. True: but not because they are mouldy; rather because they are moist. Let any one try it; chew a portion of sound dry shuck: you will find it sweetish, but tough as whit-leather. Soak it an hour or two in a glass of water, and try again: and so, as my Lord Coke says, "so note the diversity." The shuck which we handle necessarily a good deal, but not as much as we do blade fodder, and then throw away, almost, in muddy cow pens, is worth nearly as much as fodder. How much chaff is left rotting in piles? and yet good chaff, of clean strawed, healthy, beardless wheat, is worth as much as hay. Not that it contains upon analysis the same amount of food; but that in its thoroughly divided state—a state that the finest cut hay can never attain to—it offers its pabulum to the stomach in a form so much more accessible

* Of course I fed on green food until the clover began to salivate the horses, which was about or shortly after harvest. Then I fed shucks and new oats.

than hay, that it affords an equal available amount of nutriment. Here then as substitutes, are two articles of known efficiency; and one of them, the shucks, treated as I have suggested, is indispensable to the cotton-planter for his mules, and may be turned to an equally valuable use with us. I once got a friend to make the calculation for me, on a piece of low ground corn planted thickly, of the weight of shucks per acre; he made it 600 lbs. upon the data he obtained. Take half that quantity as correct for upland, and we have 30,000 pounds of shucks which, at 20 lbs daily to each of ten horses would give, on a hundred acres of land, enough long food to last them five months. The chaff would last them a greater or less period according to the relative quantity of wheat made.

I come now to my third substitute, which, like an amendment to an amendment, is a substitute for one of my substitutes. I speak of oats. The *policy* of making wheat after corn is a question I do not propose to discuss, nor the better policy of making wheat after oats—I know there are exceptional cases, but I do not speak of them. I assume for the present that wheat should not follow corn. Now, why do we cut up the stalks, whether we have previously gathered the fodder or not, and haul them, often a mile or more to the farm pen? Why? We do it that cattle may pick them, make water on them, dung on them, and give them fourfold weight of useless rain-water which mass, often a loblolly, we call manure; and that we may haul them, thus quadrupled in weight, an equally long distance in the spring and spread them on the land to dry. Now, let any man compute the more than five-fold labour of this process and see what it costs. "But we must have manure." Very well; have it, but don't pay so high for it. Haul your stalks from the low grounds, if you have them, for the benefit of the upland. But what stalks are on the upland leave there, blades and tops on them, and run your cows over them in all suitable weather during the winter. It will be better for the cows; they will get more food from them in this way than if thrown to them in a close pen; and the exercise will keep them in better order than if their systems are permitted to stagnate into lousiness under the best shelter. Then, in early spring, instead of hauling out the usual mixture, take the time it would cost you to do that—no more—and with a two or three-horse plough with a good, heavy chain running from the far end of the off swingle-tree to the top of the beam at the throat of the plough, bury the stalks and along with them the dung and urine your cattle have carried out for you as an incident. Having ploughed it, sow it in oats, and my word for it the *excess* of oats per acre thus made over what the usual plan gives will be worth more than that blade fodder from the same land which directly and indirectly costs four times its value to secure it. Then it will be a mere circumstance to fallow that oat stubble for wheat; it will bring you at least as much as the corn land would have done, and of a far better sample; and if it shall need manure, why instead of dung and urine and rain water, which you would have hauled out in the spring—a total haul back and forth at 12 loads per acre, of not less than 54,000 lbs. per acre—just apply by drill or broadcast one hundred pounds of genuine Peruvian Guano—the essence of dung and urine—and trust to Providence for the water. The difference in the saving of labour in hauling is as one hundred pounds to twenty-seven tons! the resulting product of wheat precisely the same; and the labour now appropriated to pulling fodder can be spent on tobacco, picking peas, ditching, shrubbing, anything you choose.

"But the cattle will trample the land in winter." Not to hurt it. Remember the story of Earl Fitzwilliam who compensated in advance his tenant, complaining that the Earl had ruined his wheat by fox-hunting over it in winter when it was wet; and how the honest farmer at harvest returned the money, saying he could see no difference between the trampled and untrampled land.

"But if this be so, which we doubt, we *must* have feed for our cattle in snows and rains and very muddy weather." Not to be stiff-necked, I admit it. Then try the Sorghum: cut it up at the root when ripe and cure it in shocks as you cure corn at a similar period. It will cure as well, they say, and retain its flavour unimpaired or slightly acidulated through the winter. I presume stock will eat it well, because I know they will eat a dried stalk of sugar cane, I having tried that recently. If that does not suit, make chaff and shucks and straw go as far as possible, feeding the horses on the excess of oats that the corn

land will have yielded, and cut up as little corn as possible.

"But we cannot sow that much land in oats." Very well: add straw and stable manure and guano to a part of the land and make tobacco on it; or sow it in peas, as I do in part; or let it lie under the shade of the stalks and improve; or, if stiff land, plough it up in beds and let it take the sun: *that* process never yet injured stiff land.

"But admitting that you have, or think you have, fed successfully on such offal as you name, can you give another instance of similar successful practice?" I can; and a very remarkable one, which is as follows: several years ago, I knew very well a farmer, now dead, who lived on the edge of a town in Virginia. Though he was a farmer, a part of his business was to sell wood to the citizens of the town. His punctuality secured him as many customers as he wanted. He kept two six horse wagons, and twelve powerful horses. With these teams he hauled four miles over mountain roads a cord and a half of eight foot wood—season oak and hickory—at a load, good measure; which was half a cord to the horse. His wagons were always going when his ploughs were not. Rarely did I ever see his horses at pasture except in harvest. He cut no hay, though he had a plenty of clover, because he rented the grazing of his pastures to the town, and sold milk and butter from his own cows, thus making with no labour more than the hay would have been worth. He pulled no fodder, because it paid him better to cut wood. Knowing this, and seeing that his horses, who often hauled 120 bushels of wheat six miles to a mill, were always fat, I asked his mode of managing them. He told me that he fed them liberally on meal, little or much according to their work, and on chaff or *wheat straw*, and nothing else, mixed up with the meal. His cornstalks and shucks *I think* he gave his cattle. In the summer his horses were turned out at night. Here then was the whole secret: meal, chaff and wheat straw kept those horses fat though they worked almost without intermission, and always under the strain of a full load. If *they* could do it, as they did for ten years to my knowledge, why cannot plantation horses with so many intervals of long rest do the same? And if they can, why pull fodder, even were it no worse than robbing Peter to pay Paul?

I have said nothing, Mr. Editor, about hay, because I wished to shew by "what has been done" and therefore "can be done again," that with or without Chinese Sugar Cane, and with or without the proposed plan of raising oats instead of wheat on the corn land, the ordinary offal of the farm, is sufficient to keep teams without using corn fodder. But I would by no means be understood as discouraging the making of hay. For farm horses clover hay is the best when well cured—and it is very easy to cure it well—and on all tobacco farms it interferes less with the culture of tobacco than any other hay plant, except orchard grass; it comes before harvest, and rarely treads on its heels, whereas all the rest come after harvest, when oats, wheat-threshing and worming tobacco demand all our time. But it is obvious that either clover on the one hand, or timothy and herdsgrass on the other, interfere less with tobacco than fodder does.

Never having pulled fodder, I cannot say of my own knowledge what amount can be gathered in a day; nor how much an acre will yield. But I have heard it said that hands could not earn more than 75 cents per day at it. If this be true, and it be also true as John Taylor of Caroline said, that one moiety of the crop was lost on an average, it must be rather a small return for the investment. Years and years ago, when labour was cheap, negroes then selling at $300, one might have stood it. But now, at the present price of negroes, when the interest on his value, insurance or charge for replacement, taxes and maintenance will swell the actual cost of a good hand to 80 cents a day, and when his work must produce enough to cover the cost of the young, the aged and the idle, one cannot afford to employ him in work worth five cents less. Nor in any event, in view of the prices of other staples and of the increased value that the improvement of land gives to capital, can a farmer of the present day afford the expensive luxury of a fragrant bundle of "good old fodder."

This view of the question, the cost of our labour, is not often presented, and is rarely taken. If it were more studied, I believe a good many of our farm practices would be found alarmingly unproductive. At another time I may, perhaps, say something about that; but it is time this article were concluded.

I have not thought that what I have writ-

ten would produce much effect on those who have been following the beaten track for years. But I hope that younger farmers, who have more recently entered the profession, with a smaller working force than was formerly deemed necessary, and the further difficulties of dearer lands and a more expensive, though less abundant style of living, may find herein matter for reflection, if not rules for practice.

STOVER.

For the Planter.

Tobacco Culture—Not Necessarily Exhausting or Demoralizing.

Mr. Editor,—A writer in the December number of the Planter, pitches into the cultivators of this important staple, with the declaration, that "it is the bane of Virginia Husbandry," and that it is the most "laborious, exhausting and demoralizing of all crops." Thus far, the 1st charge only in the indictment is made up, the writer having devoted a large space to a description of the labor incident to the preparation for the crop, in doing which, he has been compelled to admit, that the cultivators of this "demoralizing" weed, evince a degree of forethought, care and vigilance "unequalled in any other department of agriculture, in this or any other country." I propose to meet the objections he has urged, and will yet bring forward to the cultivation of this important crop, and shall prove that its culture is not, necessarily, either exhausting or demoralizing in its tendency. It may be premised that other, and far more distinguished opponents have assailed the cultivation of this crop. King James perpetrated some *twaddle* on the subject, which, to say the least of it, entitles him to no high rank among British classics, and Mr. Jefferson's strictures, founded upon the then prevailing and improper system of cultivation, has long misled public opinion at home and abroad on the subject. Besides such formidable opponents as a king, and a republican president, other and lesser men, seeking to arrest public attention, and to obtain a reputation for sagacity and philanthropy, by riding some easily ambling hobby, have entered the lists. They emulate the Eastern fig vender, crying aloud in the market place, "in the name of Allah, and the Holy Prophet—Figs!!" We pray for a deliverance from this class of reformers, who, having no capacity to initiate the great social reforms demanded by our age, and forgetting that ignorance, intemperance and vice, are every where to be met and fought, yet turn their batteries, charged with ignorance and prejudice upon great industrial interests, with which are identified men as moral and as progressive in agricultural improvement, as any in our State: That Tobacco is better adapted to those sections of Virginia, where its cultivation prevails, than any other crop, is the testimony of all who have examined the subject. It cannot be replaced by stock-raising, for our dry summers, and the absence of natural grasses, render the tobacco growing region, for the most part, unsuitable to this business: nor by corn, which except on alluvial lands, cannot be profitably grown as a sale crop; nor by wheat, with its countless enemies. It has paid the debts of Piedmont and the South Side Counties for a century, enabling the planter to leave his slaves to his children, instead of selling them to eke out the small income which, in the absence of this crop, would have been left him by the chinch bug and the joint worm. Speaking for this country, I can safely say, that but for the large income derived from this source, Peru, with her Guano, and *Ben Green*, with his two year old mules, would have reduced us to absolute bankruptcy. I shall now proceed to notice the charges of your correspondent in the order they occur. Thus far, his whole article is devoted to proving his first position, that it is the most laborious of all crops, a position which none will deny. *It is* the most engrossing and laborious of all crops, and yet with all this labor, *it pays*, which is what we want, and pays best of all our crops. What does a man, who has any proper idea of his duties, want? Is it not constant and remunerative labor for his people? The tobacco crop, which involves no great strain upon the physical energies of the laborer, furnishes employment in all weather, makes available the labor of women and young slaves, who would otherwise have to be sold, as being surplus hands, or maintained during the winter months in idleness. In its manufacture for purposes of commerce, thousands of slaves are employed, with a like exemption from exposure. It is a powerful conservator of the "peculiar institution" in Eastern Virginia. Abandon its culture, and one half of the slaves employed on tobacco farms, and *all* who are employed in its manufacture,

will have to be dispensed with. Are its opponents in favor of any farther depletion of slavery from Eastern Virginia? Do they desire to see the manacles of the slave dealer on the hands of the thousands of intelligent factory operatives, whose labor adds so materially to the growth and prosperity of our cities? This will be one of the effects of its abandonment. There is then no force whatever in the objection that it is a crop requiring great labor. Constant attention, system and perseverance is all that is necessary in its culture, qualities to be encouraged under any system of husbandry. The character of the labor required is, at no time, under proper management, oppressive or greater than any other crop; it keeps our slaves in old Virginia, and what is better, *keeps them at work;* and finally, its cultivation yields a large annual profit, at a time when no other crop is ready for market.

As to the exhausting nature of this crop, the charge is not yet supported by your correspondent, nor can it be proved to be necessarily so. On the contrary, it is the most improving crop in our rotation. The consumption of timber is no object, where timber is very abundant; where there is a scarcity of it, plants for the crop, by the use of Guano alone, can be produced in abundance, and charcoal used in curing, instead of wood, which is an economy in fuel. Exhausting systems of cultivation every where prevail. Land may be impoverished by repeated cropping, without rest or grass, it matters not what staple is cultivated. Because it is sometimes the custom to cultivate tobacco year after year, on lots which absorb all the manure of the farm; it by no means follows that this is the only or the proper system. Indeed no one pursues this vandal system of cultivation, unless he be a renter of land, or a man whose mission it is to scar the bosom of mother earth, of which class there are many from tide-water to the Blue Ridge. It is the custom of all good planters to cultivate a mixed crop, under a proper rotation system, say that of four or five fields, of which one is in tobacco and corn, one in wheat after tobacco, (the best of all preparations for that crop,) and two or three in grass. Under such a rotation, with the aid of clover, plaster, peas and manure, which in regular order will be applied to every part of the farm, the land rapidly improves—tobacco performs a most important part in cleansing the land, and preparing it for wheat and grass. Let your correspondent visit Albemarle, Halifax, or any other county where this crop is *intelligently* and properly cultivated, and he will witness a degree of improvement and prosperity not exceeded by any part of the State. He will farther more learn, that the Sabbath day is not more desecrated by the planter than others, to avoid the contingency of frost, which when it comes, generally finds the crop of the industrious planter safely housed. Indeed so rarely does the necessity occur, to cut a crop on the Sabbath to save it from a threatened frost on the following Monday, that I know of no instance of its being done, except by men who habitually prefer to work 365 days in the year.

I am admonished by the length of this article, that I must defer until your correspondent again appears, all farther comments; but I propose a reply to any argument which aims to prove tobacco a demoralizer.

The writer of this article has tried both systems, tobacco as part of a system of mixed crops, and another system in which there was less labor, and greatly reduced receipts. He was induced many years ago, by the arguments and advice of a distinguished opponent of the weed in Virginia, to abandon its cultivation entirely. This gentleman cultivated a model farm, realizing a yield of wheat and corn, which if general, would leave no excuse for cultivating tobacco. But these results were accomplished by the aid of what Sydney Smith considered the most important requisite of good farming, viz. money, and this was provided by an adjunct to his Virginia farm, which the gentleman possessed down in Alabama, where they cultivate a crop as laborious and exhausting as tobacco. I persevered and gave his system a fair and honest trial, and found at the expiration of five or six years, that I had no Alabama adjunct to my Virginia estate, but that several of my slaves *had taken up their permanent residence in that State*, having been sold to meet deficiencies. I have returned to its cultivation, and connected therewith grass and the cereals. I assign it no such position as that of "the Idol God of the Plantation, before which your correspondent, getting eloquent and indignant, says every thing else is thrown down and trodden under foot." But I cultivate it, I chew it, I smoke it, and from all these operations derive great pleasure, and from the first the bulk of my farm income. McC.

Ditching and Manuring.

A friend in North Carolina has obligingly furnished us with a copy of the Transactions of the State Agricultural Society for 1857.

It contains the proceedings of the society at its annual meeting in October of that year; the annual address of J. L. Bridgers, Esq.; the premium essays, including several valuable ones on the subject of horizontal ploughing and hill-side ditching; and reports upon crops, &c., &c.

We shall recur to some of these essays in a future number, directing our attention for the present to the address of Mr. Bridgers. It is—what agricultural addresses should always be—of an eminently practical character, affording explicit and more or less full instruction on clearing, ditching and manuring; on fallow lands, and on cultivation, and closes with a few appropriate remarks on the science of agriculture.

We cite below a few extracts in relation to ditching and manuring.

DITCHING.

"An excess of water is hurtful in several ways: 1. It excludes the atmosphere; 2, it changes the mechanical condition of the soil; 3, it retards decomposition; 4, it renders the soil cold by evaporation; 5, the roots of many crops will not extend any deeper in the earth than the atmosphere penetrates, whilst other crops never mature if their roots reach the region of perpetual moisture; 6, it generates an acid or some other quality injurious to vegetable life.

"As to the first point, it is a self-evident proposition, that when the earth is filled with water the atmosphere is excluded, for the atmosphere fills up all space which would otherwise remain unoccupied. The roots of the growing crops ordinarily descend to the depth to which the atmosphere is freely admitted, and on most soils that is determined by the plow. This is clearly illustrated by observing the field after heavy rains, when it will be discovered that the length of the roots is governed by the depth to which the earth has been broken. This is especially noticeable in the very narrow space in which the point of the cast plow goes deepest, for this space is entirely filled with the roots of the crop. One great object of plowing is to admit the air into the soil; when the crop is clean and the soil has a slight crust, and is very soft beneath, I know of no other object for plowing.

"Secondly: It is almost purely a question of observation. Every planter has noticed hard bottoms become soft and friable by ditching; this is so generally known that it might be argued that all hard lands are owing to an excess of water. After having been thoroughly saturated for some time, portions of the earth are dissolved, and on drying become hard. So, while the water is present, the atmosphere is excluded, and as the water evaporates the closeness and hardness of the soil continue to exclude the atmosphere.

"Thirdly: It retards decomposition, and thereby renders the soil less capable of sustaining the growing crop. It is not known what length of time is required to decompose vegetable matter entirely submerged, for the atmosphere is the chief agent in decomposition, and every fact and argument that shows that an excess of water excludes the atmosphere from the soil, equally tends to show that it retards decomposition. In illustration of this, it is well known that the compost heap may be put up so wet that fermentation will not take place.

"Fourthly: It renders the soil colder by evaporation, and consequently the crop more backward. This may be well illustrated by placing a kettle of water over the fire for some minutes. The water is only slightly warm, if so at all, what has become of the heat applied to the kettle? It has been received by the water in a latent condition. In the spring of the year, while the heat of the sun would have been warming the soil, it is engaged in evaporating the excess of water. In our short seasons would it not be much better to drain the water off with the spade, for the surplusage must be disposed of by the sun or the spade, before the soil becomes fit for cultivation.

"Fifthly. There are some soils in which the roots of the crop seem to be limited in their downward tendency by atmospherical influence. In freshly cleared land, which is imperfectly drained, it may be observed that the roots of corn descend to a certain distance with great regularity; it will then be ascertained that they cease their downward tendancy at the point at which the water stood during the winter. And it may be announced as a proposition, so far as I know, universally true, that cotton never bears well when the tap root reaches the region of perpetual moisture, and this is one of the reasons why the cotton crop so often fails on swamp land. This is so often the case that

in the opinion of many planters swamp land will not produce good cotton, but this is an assumption the contrary of which may be proved by experience.

"Sixthly. It is a well attested fact that some bottom lands which have been cleared, and also some which have not been cleared and poorly drained, will not produce a good crop the first year after draining. This is generally reputed to be owing to the acid condition of the soil. It is not so clear what is the cause, but there is no doubt of the fact. Sometimes such land fails entirely under a liberal application of manure. I have noticed an instance of a bottom which had been turned out for several years; it was ditched and planted in corn the same spring; from a gill to half a gallon of cotton seed was applied to the hill to note the effect of the different quantities. The crop, in a good season, was a failure, and two-thirds of the bottom did not manure a single ear; the second year the same land produced a fair crop, and the third year a much better one. Such facts are sufficient to convince the planter of the paramount importance of a thorough system of draining. Often the deleterious effects of imperfect draining are so slow and gradual as to escape observation, and the premature sterility of a once good soil is charged to the weakness of the ground instead of the ignorance of the planter.

MANURING.

"Here we approach the great question of manuring, for we cannot believe that the Creator intended that the earth should diminish in fertility by cultivation any more than that he designed that the human race should linger and perish away from its surface. We go farther: unless the earth can be increased in fertility whilst being cultivated, famine and pestilence are the final destiny of man, for there is a certain ratio between production and population. So we must conclude that the Creator has provided ample means for the support of the human family; for a while, man may devastate the fairest portion of creation, but sooner or later he must yield to the laws of nature, and discharge those higher duties which every citizen owes to posterity. To support himself and family he is compelled to restore to the earth that fertility which in his pride and ignorance he had wantonly destroyed.

"We have no means of computing the value of a proper system of manuring, whether as a source of national wealth or individual prosperity. It adds to the beauty of rural scenery, often restores health to the most sickly section by removing those causes which originate sickness; it substitutes activity for stagnation and plenty for want; it banishes sterility and clothes the barren field with waving corn. * * *

"The greatest difficulty is in obtaining the materials with which to manufacture manure, and the question, with an air of credulity, is often asked, how is it possible to manure from three to five hundred acres of land annually? Soil and sub-soil constitute the great and illimitable supplies for manuring. I have never seen a soil, except, perhaps, some very coarse and sandy ones, which would grow any vegetable matter, that would not constitute a valuable element in the compost heap. Whilst using many varieties of soil, white sand itself becomes a valuable ingredient; sub-soils are often worth more than old soil cultivated incessantly for years. Perhaps in the future, the sub-soil is to become the main supply. The surface of all uncultivated lands, and of land not too long cultivated, yields a fine supply, especially low or swamp lands. Sometimes it will be convenient to leave small branches and ponds in the field to haul their contents to the compost heap; the ditches are often deepened and widened with the same intention; the grasses which usually grow in ditches, are valuable for this purpose, especially on land long under cultivation. Every old field which produces broom-straw, especially when used with marl or ashes, by taking off the surface, makes a fine manure. This material, combined with some very sandy earth, yields the most remarkable result I have ever seen. Some old-fields of very limited fertility, when treated with this preparation, produce remarkable crops of cotton; sometimes this compost surpasses the river mud with this crop. Fallow land yields a much better material than the same land under the plow, besides being much lighter to haul. The effort has been made to use the same soil designed to be cultivated, but unless the land is new or lies fallow every other year, the heap soon fails. All soils and sub-soils which may be fermented, and all vegetable matter which may be decomposed are valuable for compost.

In preparing for composting, it is advisable, especially when the material is rough, to hoe or plough it sometime in advance, so

that the atmosphere may be reducing it to a better condition. Rough soils and sub-soils, particularly those recently drained, are very much improved by freezing and thawing. Perhaps it would be of advantage to speak of the compost heap more particularly: the compost here spoken of, is put up in the field. For the convenience of hauling in the spring a heap is made in each acre, the material is thrown up with shovels as it is hauled in single horse carts; experience having shown that they are well adapted to hauling over cultivated land. The compost which is made in the summer is superior to that made in the winter. The heaps are broken up in the spring, and generally it is advisable to check the land so as to place the manure with more regularity; it is either placed in the drill or broad cast with the shovel. I shall consider the bulky material used as the mass of the heap and the other ingredients as stimulants or the decomposing elements. Haul together of the material designed to be used about one hundred and twenty-five loads, the load being five bushels. But if the coarse and apparently poor material is not made to undergo some change, the heap will be a failure; to accomplish this, we select some active ingredient which will produce fermentation, and thereby release the latent fertility of the material. In Edgecombe the agents generally used for this purpose are cotton seed, stable manure, marl, lime, ashes and any vegetable matter easily decomposed, as the rank weeds growing about the ditch banks, and from twenty to thirty bushels of cotton seed to the heap.

"In putting up the heap, place a layer of the material as thinly as possible, always remembering that the more thoroughly the soil and seed are intermixed, the more valuable will be the manure. If a supply of ashes or marl or any other alkaline substance can be procured, it will make a valuable addition; the ashes, from fifteen to twenty bushels, marl from twenty to thirty, are to be sprinkled over the cotton seed. Formerly, the seed and ashes were kept apart as much as practicable, but experience showed a better result when they were put together, for one great object of composting is to produce fermentation and decomposition, and the seed produce heat in proportion to the rapidity of their decomposition. Then let the mixture proceed as thoroughly as possible, until the heap is completed, with the top slightly rounding. The custom once obtained of putting up the heap in layers of seed and of earth without any effort to mix them, but this practice is now abandoned. When the seed are thrown up in layers, they are often black and mouldy, but if thoroughly mixed, it will be difficult to find a single seed when the heap is broken up. Whenever the seed appear in quantities, especially if partially stuck together, it is certain evidence that the heap has not passed through the proper change, for after fermentation and decomposition, the rough and hard material becomes soft and friable, and much lighter, and the seeds disappear.

"After the cotton seed, stable manure and vegetable matter are exhausted, the composition is continued with marl or ashes alone, from 25 to 30 bushels of decomposed or disintegrated marl, and 20 to 25 of ashes are the quantities ordinarily used. For cold and stiff soils twenty-five bushels of pure stable manure, with the same quantity of material, make a more valuable heap than a like quantity of cotton seed. Where the materials can be easily obtained, it would be better in diminished quantities to use them all in the same heap. Some swamp soils, after having been exposed for some time, thrown up and allowed to decompose, act very finely without any stimulating ingredient whatever. Whenever lime, marl, or ashes, or all together are used, it is advisable to add pine straw or any other vegetable matter which is easily decomposed, to the heap.

"We may secure a limited supply of vegetable matter of great fertility, by sowing peas thickly on the ditch bank, or other material to be used; the vines and roots not only supply a fertile ingredient, but they aid in the decomposition of the mass of the heap by some solvent power perhaps peculiar to the pea.

"It is necessary to note the fact, that some soils and sub-soils freshly thrown up, do not yield to this treatment, so safely and strongly are the latent elements of fertility locked up. In illustration of this fact, there are many ponds and swamps abounding in fertility, yet they will not produce a crop the first year after draining. Such soils and sub-soils are generally spoken of as acid, without knowing the actual cause; when the soil is in this condition, the cotton seed are not thoroughly decomposed; they have become black and the hull hard. If it was purely an acid soil, would it not yield its acid in combination with lime, marl or ashes?

yet such is not the fact. But when the same soil is exposed to the atmosphere, it becomes quite productive. May not this tend to show that the productive power of the earth is derived through the atmosphere? Should such unmanageable material be used in the beginning, it would have a strong tendency to confirm the belief that there is no peculiar advantage to be derived from composting.

"How such results are brought about by composting, is a question for the learned to decide, and the only light we can afford on this subject is merely conjectural. Most lands by incessant cultivation will lose their productive quality, but by being worked only every other year, they would remain in good heart for a long time. Many, after being reduced by unintermitted cropping, may be compared to an over-worked animal, but they are only rendered unfit for present use. If this is not so, why does a few years rest increase the fertility of worn out land so rapidly? It is well known that incessant cropping alters the mechanical texture of soils, and so soon as this condition is brought about, the land begins to become closer, and the process is continued until the atmosphere is first partially, and then entirely, excluded from the soil. Incessant cropping does more damage by excluding the atmosphere than by removing the particles of fertility. Hence, we conclude, that the great supply of fertility in the soil, is in a latent condition, that is, in one not fit for the growing crop. If this is not so, why does land produce for such a series of years when cultivated only every other year? We suppose that the fermentation which takes place in the compost heap developes or liberates the latent fertility in the soil and sub-soil used, and thus, artificially, is produced the same result in a short space of time which it would take the atmosphere alone several years to bring about. It is in this way, we suppose, that the heap receives its increase of active fertility. Upon trial, there will be found many valuable supplies for compost on most plantations, which are unnoticed in the beginning of the system. It is a great mistake to suppose that only rich and valuable soils and sub-soils are fit to be composted; experience soon proves to the contrary; there are many ditches cut more for the material for composting than for draining.

"Some of the most unlooked for results I have ever observed from composting, are from the use of a very sandy material; in many instances, it is advisable to add sand to the heap. Hence, it may be conjectured, that the fermentation produces some nitrate or silicate, of potash which is known to be a very valuable fertilizer. We would suggest that the soft granite met with in many sections of the State, would be valuable, especially when pounded, to add to the compost heap to afford a supply of potash."

Evil Influence of the Bearing Rein.

[From practical facts and hints furnished in a series of papers to the *Edingburgh Veterinary Review*, by John George Dickinson, V. S., we select from Dadd's *Veterinary Journal*, the following on the bad effects, sometimes, resulting from the use of the bearing rein, as a subject of special interest to the horse owner, who desires to offer nothing but humane treatment to that noble animal.—EDITOR.]

The first case I have chosen is one showing the evil influence of the bearing rein.—A bay gelding, seven years old, the property of a carman, was brought to me, presenting the following symptoms: Flow of frothy saliva from the mouth, with peculiar spasmodic twitching of the muscles of the face and throat; there was difficulty of mastication and swallowing; the head was subject to violent jerks or twitches, attended with much pain, causing the animal to run back. The symptoms had appeared after the owner had thought fit to punish his horse with a severe bearing rein. I at once removed the cause, ordered hot fomentations and friction to the affected parts, exhibited stimulants, and all symptoms subsided, with the exception of a slight cough.

We have often been told that the practice of using the bearing rein, very frequently induces roaring in horses, but the results as observed in this horse, have not hitherto been noticed so far as I am aware. In communicating the facts to Mr. John Gamgee, of the Edinburgh New Veterinary College, however, I obtained a very satisfactory explanation. Mr. Gamgee considers the symptoms due to nervous derangement, from pressure indirectly exerted by the lower jaw on the jugular vein, the freedom of the circulation being also otherwise impeded from the uplifted position of the head, &c. Mr. Hunting, of South Hetton, has informed Mr. Gamgee that he believes megrims is due to pressure on the veins at the roots of

the neck, by the collar, in peculiarly-formed horses, and he asks, "Who has known of a saddle horse affected with megrims?" Moreover, Mr. Hunting says, all horses subject to megrims may be permanently relieved, if worked with *pipe collars*. Dealers and others in some parts have learned that some horses have megrims when worked with the bearing rein or collar, whereas they are free from the disease if put to work with a simple breast-plate. As Mr. Gamgee says, we have here a more rational explanation of tight-reigning causing roaring than is usually given. It is true the old explanation is sometimes sufficient, that tight-reigning distorts the respiratory passages, and induces constriction of the trachea, &c., resulting in permanent interference with the breathing; but sometimes such mechanical interference is not the result of the use of the bearing rein, and we have the common lesion of the larynx or atrophy of its muscles. In these cases, according to Mr. John Gamgee, the superior laryngeal nerve has suffered through the repeated interference of the circulation of blood to the brain, and the early symptoms indicate general disturbance of important functions, such as those of the lungs and digestive organs, which are under the control of the pneumogastric nerve.

I beg to ask, if we find so much interference resulting from tight-reining, and confining the horse's head in an elevated position, on what principle can we defend the use of high racks? Our animals show their preference to a more natural method of picking their food by pulling the hay out of the lofty recess, and when on the ground they leisurely partake of it. This should never be lost sight of in the construction of stables.

Fattening Animals.

There are certain principles which apply to the feeding of all animals which we will shortly notice.

1. The breed is of great importance. A well bred animal not only affords less waste, but has the meat in the right places, the fibre is tender and juicy, and the fat is put on just where it is wanted. Compare the hind leg of a full-blood Durham ox, and a common one. The bone at the base of the tail extends much further in the former, affording more room for flesh, and the thigh swells out, of convex or circular shape; while in the common ox it falls in, dishing and hollow. Now the "round" is the most valuable cut, and is only found in perfection in high-bred stock. The same is the case over the whole body. So well do eastern butchers understand this, that their prices are regulated by the breed, even where two animals are equally fat. They know that in a Durham or Hereford ox, not only will there be less offal in proportion to weight, but the greatest quantity of meat will be where it brings the highest price when retailed, and will be of a richer flavor, and more tender fibre. The same is the case with hogs. A large hog may chance to make more meat on a given quantity of food than a small one, but the meat of the first will be coarse and tasteless compared with the other; and in the east, flavor and tenderness greatly regulate prices. Consequently moderate sized, short-legged, small-headed hogs, always, in the long run, beat large breeds out of favor. In preparing for a market, "fashion and taste" must be as much considered by the farmer as by the tailor. This one fact is at present revolutionizing the English breed of sheep. The aristocracy always paid high for small Welch and Scotch mutton: but the great consumers, the mechanics, preferred large fat joints. The taste is now changed. In Manchester and other such cities, these large joints have become unsaleable; and all the efforts of the breeder are now turned towards small breeds maturing early, with comparatively little fat.—According to late writers, the large Leicester and Cotswold are going quite out of fashion. When we give $3,000 for a Durham bull, it is not that his progeny are "intrinsically" more valuable to that amount, but the increased value and the fashion together, make up the difference. And it is thus, that while Durhams and Herefords are preferred for ships and packing, Devons are high in repute for private families. The joints are smaller, but the meat has a peculiar richness, probably found in no other kind of stock; and the proportionate waste is said to be less than in any other breed. Thus in the London market, the Scotch Kyloes, and then the Devons, (the former even smaller than the latter,) bring the highest price, because preferred by the aristocracy. So in Dublin, spayed heifers are sought for. But the breed also regulates the profit.—There is nothing more certain than that one kind of animal will fatten to a given point on much less food than another, and as fat-

tening our stock is only another mode of selling our grain and grass, those animals are to be preferred which come to maturity soonest, and fatten on the least food. The difference in hogs is very great and important. While some breeds must be fed for two, or even three winters, others are full grown and fattened at ten months old; and the difference in profit is enormous. We cannot go into particulars, but the following rules may be considered as applying to all: An animal may be expected to fatten easily when it has fine, soft, elastic skin, with thin or silky hair; the head and legs short, the "barrel" large, but chest and lungs small (?); and when it is quiet, sleepy and easy in temper. An unquiet, restless, quick-tempered animal, is generally a bad feeder, and unprofitable.

2. Much depends in fattening, on outward and mechanical management. Fat is carbon, or the coal which supplies the body with heat. If we are exposed to cold, it is burnt up in our lungs as fast as it is deposited by the blood; but if we are kept warm, by shelter or clothing, it is deposited throughout the body, as a supply on hand when needed. Warm stables and pens are a great assistance in fattening, and should never be neglected. So, also, quiet and peacefulness are important. Every excited action consumes some part of the body which has to be supplied by the food, and detracts from the fat. In the climate of Michigan, warm stables, regular feeding at fixed hours, and kind treatment, with perfect cleanliness, save many a bushel of grain. Animals fed at irregular times are always uneasy and fretting.

3. Ground and cooked food fatten more profitably than raw food. Mr. Ellsworth found that hogs made as much flesh on one pound of corn ground and boiled to mush, as two pounds of raw unground corn; though the first did not fatten quite as readily, as they could not consume as much food in the twenty-four hours. By grinding and cooking, ten hogs will each gain 100 lbs. in weight, on the same food that five would do if it were raw.

4. A change of food helps in fattening. Thus an ox fed entirely on corn and hay, will not fatten as fast, or as well, as one which has roots, pumpkins, ground oats or buckwheat, &c., if fed to it at regular periods. The latter may contain intrinsically less nourishing matter than the corn, but the change produces some unknown effect on the stomach and system, that adds to the capability of depositing fat. The best feeders change the food very frequently, and find that they make a very decided profit by so doing. Salt should be given with every meal to cattle—say an ounce a day. It preserves the appetite and prevents torpor of the liver to which all fattening animals are subject. This torpor, or disease, is, to a certain extent, conducive to fat; but carried too far, the animal sinks under it.

5. In cattle the skin should be particularly attended to. A fat animal is in an unnatural state, and consequently subject to disease. Taking no exercise, it has not its usual power of throwing off poisons out of the system, and if the skin is foul, the whole labor is thrown on the kidneys. It is found by experience that oxen, regularly curried and cleaned daily, fatten better and faster than when left to themselves; and if the legs are pasted with dung, as is too often the case, it seriously injures the animal.

6. Too much rich food is injurious. The stomach can only assimilate a certain quantity at once. Thus an ox will prosper better on thirty pounds of corn and thirty lbs. of cob ground together daily, than on forty pounds of ground corn. These mixtures are also valuable and saving of cost for hogs when first put in the pen. If an animal loses its appetite, the food should at once be changed, and if possible, roots, pumpkins or steamed hay may be given.

7. Oxen will fatten better if the hay or stalks are cut for them, but care must be taken not to cut too short. An inch in length is about the right size for oxen, half or three-quarters of an inch for horses.—*Farmers' Com. and Horticultural Gazette.*

Is Tobacco an Exhausting Crop?

MESSRS. EDITORS.—In an article signed "L." and dated Dinwiddie, Jan. 27th, 1858, I find the following passage:

"Tobacco is of all crops the greatest exhauster." As I dissent utterly from this assertion, I beg leave to submit my views on the subject. I know that the opinion expressed by "L." is a very common one, and that it has led to very pernicious results in Virginia. I well remember that many years ago, I was directed by a resolution of an agricultural society, not a thousand miles from your city, to solicit a distinguished

and talented gentleman—one of the first men, and, most successful farmers of the State—to favor the society with an address at its annual meeting. That gentlemen entertained the same opinion expressed by "L.," and declined to comply with my solicitation, on the ground that he could not make a speech on agricultural improvement without throwing discouragements in the way, as he did not think any improvement could be made, while tobacco was our staple crop; and to dispense with that crop was out of the question. My own observation and experience, being utterly at variance with such a view of the subject, I was induced to prepare an article, presenting, as I did and still believe, the reasons why it was that so many err on this subject. That article, so far as I know, has never been controverted.

But to the point. Is tobacco so great an exhauster? I say no: and for the best reason in the world, that any crop, succeeding tobacco, is universally superior to that succeeding any other hoe crop or fallow whatever. Wheat, oats, corn, and every thing, grows well after tobacco.

If "L." had imputed the exhaustion of the soil to the errors which tobacco planters generally commit, in their system of cultivation, instead of the tobacco, I might have concurred with him.

What has been the practice of our planters in time past? Aiming at large crops, they have applied all their manure to the tobacco fields or lots and followed the crop with wheat, and the wheat with tobacco, and so alternating every other year until the portion of land appropriated to these crops actually becomes sick of them. Whereas if clover had followed the wheat, and a new shift been selected every year, on which to make the crop of tobacco, and in this way a three or four shift rotation had been followed—to wit, tobacco, wheat, clover—very different results would have followed.

I could name planters who have pursued this system until they have manured nearly their entire farms. We all know, that land that has produced a fine crop of tobacco will produce fine wheat and fine clover; and that land that is made rich enough to produce these three crops in succession, may be kept rich enough to produce fine crops of tobacco *ad infinitum*.

We will suppose that a planter who cultivates 20 acres in tobacco, annually, will manure and clean that much annually, and that he will, after taking off the tobacco, put it in wheat and clover, and go on to manure the same quantity on another part of his land; until in four years he will have put 80 acres in good condition to produce fine crops. Having secured this much for his tobacco crops, he may then rely on the clover to keep his land in good heart, and may go on adding 20 acres of land annually to his manured surface for corn. We will suppose that having thus secured a regular four year rotation for tobacco, and adding 20 acres annually for corn, his facilities and resources for increasing the manured surface are rapidly adding to the productive capacity of his farm. In fact, every improved acre gives additional means of improving every other acre, until finally, if this system was adhered to by our planters generally, we would soon hear no more of the exhausting effects of the tobacco culture.

We verily believe that this mistaken notion, that tobacco is an exhausting crop, has done as much, if not more, to depopulate Virginia than any other agency. I am anxious to see such notions give place to enlightened, practical experiments.

We had some experience in the practice of the system which we recommend in our youthful days, and therefore speak with confidence of its efficacy. We took an old dilapidated farm. We commenced on a small scale to enrich our tobacco lots, put them in wheat and clover, and occasionally cleared some land to make out our crops. In a few years we had risen, by this system, from crops of 10 to 18 or 20 hds. of tobacco annually. Had we pursued it on the same farm, up to this time, there is no telling to what extent our improvements would have reached.

We recommend to "L." to try this system. It can do him no harm, and may perhaps benefit him very much. If he makes his land rich enough to produce fine tobacco, it will produce fine wheat and fine clover. If it produces good crops of clover once in three years, he need not fear but that it will produce also good crops of tobacco every third year; and if he will add occasionally a bushel of plaster to the acre on clover, he need entertain no fear that it will ever get poor; but on the contrary, may rest satisfied that it will continue in good heart, if it does not improve.

It is by no means uncommon for farmers to look any where, for reasons for the decline of their land, but to their own mismanagement. We are too apt to blame the seasons, or the soil, for our failures to make good crops when perhaps if we could scrutinize our own doings, we might come to very different conclusions. Let us then make the best use of our means. Let us bestow on our old mother earth some returns for the bounties she is continually pouring into our garners. Let us not impute our ill success to the crops we cultivate, but to our injudicious waste of labor in running over too much surface. Let us not be ever looking west for graves, but let us cleave to the good Old Diminion, and make our graves beside those of our fathers.

The cultivation of tobacco is not necessarily pernicious to our soil. Pursued wisely, it is indeed an ameliorating crop. It is a cleansing crop. Do you want a good meadow? Put it first in tobacco. Do you want a beautiful lawn around your dwelling? put it in tobacco, then in grass. Make your land rich enough to produce a fine crop of tobacco, and it will repay in any other succeeding crop, whether it be corn, wheat, oats, grass, or any other crop.—*Southern Farmer.*

Currency Terms.

The origin of the word sterling has been explained as follows in a correspondence of the *Transcript*:—

"Your correspondent refers to the pound *sterling* or *easterling*, which word, I believe, is commonly spelled *esterling*. Some of your readers may not be aware of the origin of the word *sterling*, about which antiquarians have doubted. The word *esterlings* may be found in Spelman's glossary. The word was first applied to English pennies, in the reign of Edward I., about the year 1279. Henry, in his History of G. B., vol. vi., page 297, London, 1814, says—'In the course of this period, the silver penny is sometimes called an *esterling* or sterling; and good money in general is sometimes called *esterling* or *sterling* money.' It is unnecessary to mention the various conjectures of antiquaries about the origin and meaning of this appellation. The most probable meaning seems to be this:—that some artists from Germany who were called esterlings from the situation of their country, had been employed in fabricating our money, which consisted chiefly of silver pennies, and that from them the penny was called an *esterling*, and our money *esterling* or *sterling* money.

"I used to be puzzled to know why a certain coin was called a *milled* dollar.—Antoine Brucher, a Frenchman, invented the '*mill*' for making money, and money was first struck with it, in 1553. It was brought into England by Philip Mestzel, and Elizabeth had *milled* money struck in 1562. It was used in France, till 1585, and in England, till 1572, but gave place to the cheaper expedient of the *hammer;* which, in 1617, gave place to the engine of Belancier; which was merged in the great improvements of Boulton and Watt, at Soho, in 1788. In 1811, the art was brought to very great perfection, at the mint in London. One of the most interesting objects, at the present day, in Philadelphia, is the whole process of coinage, from first to last, from the crude California snuff, as it enters the melting pot, till it verifies the proverb and taketh the wings of an *eagle* and flieth away."

The dollar mark ($) is derived from the use of the old Spanish pillar dollar, which was of very general circulation and known value, the two pillars enclosed with an S became the cypher for Spanish dollar.

Hunt's Merchant's Magazine.

A Note worth Knowing about Peach Soils.

Rivers, the well known fruit culturist, observes in the latest edition of his catalogue, that having noticed that his peach and nectarine trees did best where planted close to a pathway where the soil was well trodden down, he has found that the best preparation for peaches and nectarines, is to give a poor and exhausted soil a good dressing of rotten dung and clayey loam, equal parts, dug in two feet deep. When the trees are planted, which should be in spring, the ground all over its surface should be thoroughly rammed down with a wooden paving rammer. After this a dressing of compost about an inch or two in thickness may be added. The ground should be kept clean, but not stirred during the summer. After the ground is once rammed, it should not be cropped or stirred in any way except to keep it clean. And every spring the ramming should be repeated, and the top dressing added. But neither spade, nor shovel should be permitted to disturb the soil.—*Prairie Farmer.*

From Russel's Magazine.

Notes on the Pine Trees of Lower Virginia and North Carolina.

By Edmund Ruffin.

Pines made a large proportion of the trees of the primitive forests of the eastern and lower lands of Virginia and North Carolina. And when any of these lands had been cleared and cultivated, exhausted and abandoned, then a new growth of pines formed the universal unmixed cover. As nearly all the lands of lower Virginia had had been thus treated, and in succession had reached this second growth, which thus covered all the then poorest and most worthless lands, a general cover of pines, and the term "pine old-fields," came to be generally understood as indicative of the poorest and meanest of lands. For this reason, and also because of the growth of pines being so common and pervading, these trees were not only undervalued, but despised. If a natural forest of various trees was thinned out to make an ornamental grove near a mansion, every noble pine would be certainly cut out, as if a deformity, and a worthless cumberer of the ground. In planting trees for the embellishment of homesteads, if any proprietor had in part selected any of our native pines for that purpose, his taste would have been deemed as ridiculous as it was novel and strange. For the most magnificent pines, or the unmixed evergreen of a pine forest in winter, to be admired, it was requisite that the observer should be a stranger, from some distant region, in which pine trees and pine forests were not known. Then, indeed, and in all such cases, their remarkable beauty and grandeur would be fully felt and acknowledged.

All of the many species of pines have the properties of being resinous, and bearing their seeds in cones; which, however varying in size and form have a close general resemblance. And there is a like general similarity of shape, differing from all other trees, of their peculiar evergreen leaves. These spring from seaths, or are held in clusters of two, three or more leaves to each sheath, according to the species of the tree. The leaves, differing from all others, except of the kindred family of the larch, are long and slender, almost as thick as their width, and of equal diameter throughout their length, except immediately at the extremity, which is a sharp point. The new leaves as on other trees, grow only on the new twigs (or 'water-sprouts') which shoot out in the spring, from the last year's buds. But the leaves of the preceding year's growth remain attached to the older branches through a second summer, if not the autumn also. In some species the leaves sometimes in part remain into the third year before dropping off entirely.

Some of our species of pines are of such distinct and marked appearance, that the most careless observer would not fail to distingush them. Such are the Southern long-leaf pine, (*pinus australis*,) the Jersey pine (*p. inops*,) and the white pine, (*p. strobus*.) But many farmers who have long lived on cultivated lands, among pines, have not learned always to distinguish other still more common species. And even when this knowledge is not wanting, still there is such confusion and misapplication of the vulgar names of all the kinds, that it is difficult for any one to speak of or to inquire concerning any one pine, by the vulgar name of his own neighborhood, without the name being misapplied by an auditor from another locality. Thus, the name "yellow pine," in different places is used for three different species, of all of which the heartwood is more or less yellowish. The name "spruce pine" is used in Virginia for one species of pine, and farther south for another. And the several designations of "long-leaf pine," "short-leaf," "old-field pine," &c., are merely terms relative, or used in contrast with other different growths, and are each applied to different kinds in different places. Even the botanical names, though serving generally for exact designation, in most cases have either no special application, or are entirely erroneous as to their meanings. Such are the designations "*mitis*," "*inops*," and especially "*palustris*," as descriptive terms of species. Further, the qualities and value for timber, and even appearance of pines of the same species, are so much varied by different conditions of situation and growth, that some of the most experienced and intelligent "timber-getters" (or "lumberers") consider as two distinct species, trees which belong to the same. I have, myself, until recently, been under some of these mistakes as to the species with which I had longest been familiar. Under such circumstances I cannot even now be confi-

dent of avoiding errors. But even my mistakes, (if corrected by others better informed) as well as my correct descriptions and designations, may serve to clear away much of the obscurity and error in which this subject has been involved.

One of the most remakable and valuable qualities of some of the pines is, that their winged seeds are distributed by winds to great distances, and in great numbers, so that every abandoned field is speedily and thickly seeded, and the kind of pine which is most favored by the soil and situation, in a few years covers the ground with its young plants. The growth, especially of the most common second-growth pine, (*p. tæda*,) is astonishingly rapid, and even on the poorest land. And while other land might still be bare of trees, that which favors this growth would be again under a new and heavy, though young, growth of pines. This offers, (especially in connection with the use of calcareous manures,) the most cheap, rapid and effectual means for great improvement of poor soils. And besides this greatest end the cover of the more mature wood, if marketable for fuel, will offer the quickest and greatest return of crop that could have been obtained from such poor and exhausted land.

I will now proceed to remark on each of the several species of pines found anywhere in the region in view, and will commence with such as are most easily and certainly to be distinguished, before treating of those less distinguishable, or in regard to which there may yet remain any doubt or uncertainty.

1. *The Long-Leaf or Southern Pine.* (*Pinus Australis* of Michaux, *Palustris*, of Linnæus.)—The name *palustris*, notwithstanding its high authority, is altogether inappropriate, as this pine prefers dry soil and is rarely seen, and never in perfection, on wet or even slightly moist ground. *Australis* is peculiarly appropriate, as this tree is limited to a Southern climate.

This species barely extends a few miles north of the southern boundary of Virginia, in the south-eastern counties of Southampton and Nansemond. Few, if any, stand in the lower and wetter lands of the more eastern counties in the same southern range. The long-leaf pine prefers dry and sandy soils, and is found, almost without interruption, says Michaux, "in the lower Carolinas, Georgia and Florida, over a tract of more than six hundred miles, from N. E. to S. W. and more than one hundred miles broad;" but not, (as that author also says), from the sea to the mountains, or near to either, in North Carolina. In that state it extends westward not much higher than the falls of the rivers, and towards the sea, no farther than the edge of the broad border of low, flat and moist land. Its general and best growth also equally indicates a sterile soil. The mean size, sixty to seventy feet high, with a nearly uniform diameter of fifteen to eigteen inches for two-thirds of the height. Some trees are much larger and taller. Leaves ten to twelve inches long, (fourteen and more on some young trees,*) growing in threes, (to each sheath,) and about 1-16th to 1-13th of an inch in breadth. The cones from 7 to 8 inches long, and 2 to 2½ broad before the opening of the scales or seed-covers, or four inches when spread open. The seed-covers of the cones are armed with short, strong and not very sharp spurs. The seeds, when stripped of their shells, are white and larger than a common grain of wheat, and are of agreeable taste, though having a resinous flavor. They are so eagerly sought for by hogs, that scarcely any are left on the ground to germinate. For this cause, as well as the great destruction of the trees in tapping them for turpentine, these pines are rapidly diminishing in number, and, if not protected, this noble species will almost disappear from the great region which it has heretofore almost exclusively covered and adorned. This tree is especially resinous, and is the only pine that is tapped for turpentine. Scarcely a good tree in North Carolina has escaped this operation, unless in some few tracts of land where that business has not yet been begun. This tree also has furnished the best of pine lumber; but its durability is said to be much lessened by the tree, when living, having been made to yield turpentine. The heart is large and the grain of this timber is close, and only inferior in that respect to the short leaf yellow pine, (*p. mitis* or *variabilis.*) For naval architecture, timber of this tree, when large enough for the purposes required, is preferred to that of all other pines.

The broad belt of land stretching through North Carolina, which has been covered by the long-leaf pine, except for the borders of rivers, is generally level, sandy and nat-

* I have since found and measured leaves 19½ inches long, in Barnwell, S. C.

urally poor. Even if it had been much richer and better for agricultural profits, the labors of agriculture would still have been neglected in the generally preferred pursuit of the turpentine harvest. But so poor were the lands and so great the profits of labor, and even of the land, in the turpentine business, compared to other available products, that capital thus invested has generally yielded more profit than agriculture on the richest lands. Therefore, it is neither strange nor censurable, but altogether judicious, while these great profits were to be obtained, that nearly all the labor of this region was devoted to making turpentine, instead of enriching and cultivating the soil. But the effect of the course pursued has been not only to limit agricultural labors to the narrowest bounds, (as was proper,) but also to prevent almost every effort for improving the soil and the productions of the small extent of land under tillage. However, the juncture is now reached when this formerly most profitable turpentine business must be gradually lost; and then agriculture and improvement of fertility will not only be attended to, but will be especially rewarded in many portions of this now poor region, which yet possesses great resources for being fertilized. The rapid destruction of the forests of long-leaf pine is not only the necessary result of the two causes before stated, but the work has been still, more rapidly forwarded in some places, by another cause. At one time, in years past there was a sudden and wide-spread disease of this kind of pine, caused by the attack of some insect unknown before or since. Fortunately the operation, though far extended, was not general. But wherever it was, the destruction of the living trees was nearly or quite complete. For thousands of acres of pine forest together, and in a single summer, every tree was killed. The evidences of such destruction in the still standing dead trunks, are now seen in many places, and most extensively, as I lately saw, along the route of the Wilmington and Manchester Railway, not many miles south of the Cape Fear river. Similar extensive, and as transient destructive visitations, had occurred long before. One of these I remember to have read of forty years ago, in a communication to the Memoirs of the Philadelphia Agricultural Society. Partial as these depredations have been, as to species, any one proprietor, or many adjacent proprietors, in the route of these ravages, might have the whole value of their pine forests utterly destroyed in a few weeks.

The great beauty and striking appearance (to a stranger) of a southern pine tree, of great size and fine form, are owing to the long and straight and slender trunk, and to the very long leaves and large cones. In the close growth of forests, the branches, like other old and good timber pines of other species, are crooked, irregular, rigid and unsightly. But these and all defects are overlooked in their forest growth, when all the numerous trees make but one great and magnificent object, their tops meeting to make one great and thick canopy of green, supported, as far as the sight can stretch, over the open space below, by innumerable tall columns of the long and straight and naked bodies of the pines.

The Cedar Pine. (*Pinus inops.*)—This pine, like some others, has sundry names and some of which are also applied elsewhere to other species. In Virginia it is known in different places as the "spruce" or "river" or "cedar pine." The last vulgar designation, which will be here used, has been applied because of a slight general resemblance of the growth and appearance of the tree to the cedar; at least more so than of any other pine; and so far the name is descriptive and appropriate. The most general vulgar name farther north is "Jersey pine," which is adopted by Michaux.

This pine is generally seen only of young growth and small sizes. Where long established, and of largest sizes, in Virginia, it is rarely found exceeding fifteen inches in diameter. The trunk is not often straight enough for sawing into timber. The bark is very thin, and also smooth compared to all other pines of this region, and the sap-wood also is very thin .Of the older trees, nearly all the trunk is of heart-wood. Though the tree is but moderately supplied with resin, it makes good fuel, and much better than other pines of Virginia, of the new growth and but moderate sizes, such as are mostly used for fuel, for market, and especially for the furnaces of steam engines. The leaves of this pine grow in twos, (from each sheath,) are generally shorter than any other kind, usually from one and a-half to two inches, and about one-twentieth to one-sixteenth broad. The cones usually are from one and three-fourths to two and one-fourth inches long, and three-fourths to one inch

thick, when closed. The separate seed-covers on the cones have each a small and sharp prickle, curved backward. The cones are set drooping backward on the branches; and they reman so long before falling, that the old and the new together sometimes stand on a tree as thick as the fruit on an apple tree. The branches are much more slender, tappering, and flexible than of other pines, and the general figures and outlines of the well-grown trees are more graceful and beautiful. When making the entire growth of a thick wood, and on the slope of a hill-side, where the tops of the higher trees are seen above the trees next below, and all thus best exposed to view, the foliage and the whole growth, so disposed, are singularly beautiful.

I have not observed this tree anywhere in North Carolina. It is but sparsely set and mostly of young growth in the south-eastern parts of Virginia. But the growth is there increasing and spreading. In Prince George, on and near James River, the young trees are far more numerous, and more widely scattered now than was the case forty years ago, when I knew them there only on some spots near the river banks. On the lower Appomattox, in that county, this is now the principal pine growth, and of its large sizes. In Westmoreland, and the other parts of of the peninsula, between the lower Potomac and Rappahannock, this is now the main growth, and the great supply for market fuel, which is so great a product and labor of that region. Yet I have heard, from Mr. Willoughby Newton, that it is remembered when not a tree of this species was to be seen in all the extent of that peninsula. It is now there the regular second-growth pine, which first springs on and occupies all abandoned fields, as do the other "old-field" pines, of different species, in other parts of Virginia and North Carolina.

The White Pine. (*Pinus strobus.*)—This tree, of beautiful foliage and general appearance, and which grows to a magnificent height, is not known in eastern North Carolina, and is so rarely seen anywhere in Virginia east of the mountains, that it scarcely comes within the limits of my designed subject for remark. However, it is named for the contrast it presents, and thereby setting off more strongly the opposite qualities of other species. But its description need not occupy more than a small space. This is the great timber pine of the northern States. In travelling westward from the sea coast through the middle of Virginia, this tree is first seen in the narrow valleys of the North Mountains in Augusta county. It is there called the silver pine. The small trees are beautiful and the large ones magnificent. The bark of the young trees is very smooth, (in this differing from all other pines,) and the branches spring from and surround the young stems in regular succession, and three or four from the same height, on opposite sides, as do the young side-shoots of dogwood. The leaves grow in fives, (from each sheath,) about four inches long, and very slender and delicate, and of a bluish green color, and silken gloss.

This pine, different from all of the other species growing in our region, prefers such fine soils as are found on the alluvial but dry margins of rivers, and in mountain glens.—[*Darlington's Agricultural Botany.*]

Short Leaf or Yellow Pine. (*Pinus variabilis.. P. mitis of Michaux.*) Cones, length 1¾ to 2 inches. Breadth, (as closed,) ¾ to ⅞. Nearly smooth, the prickles being very short, slender, and weak. Leaves, length, on different trees, 1¾ to 3 inches; breadth, 1-24 to 1-20. The leaves grow mostly in twos (from each sheath,) and many trees, if but slightly examined, might seem to show that this was the universal law of this pine. But on most trees there are also leaves, in much smaller numbers, growing in threes, intermixed with the others. This variation is especially apt to occur, partially, on very young trees, of rapid growth. On one tree, of eight inches diameter, cut down to furnish specimens of cones, I found so many of the leaves in threes, that those in twos did not amount to one in twenty. The leaves in threes being in greater number, I have not observed elsewhere. Generally, the leaves in twos on any one tree, are very far the most numerous. All the specimens, from which the measurements were made, I gathered in the old forest-land of Marlbourn farm, Hanover, Va. The lengths of leaves on different trees vary much, and in some cases, even on the same tree and twig,—and also the sizes of cones on different trees,—as well as the proportions of leaves in twos and threes. From these marked variations, I am disposed to believe that some trees are of hybrid generation, or crosses between the pure short-leaved tree of the species, and the *p tæda*. But whether this surmise

is correct or not, and however great and many may be the variations, this species, notwithstanding its variations, is easily distinguished by its short leaves in twos, from any of the three-leaved species—and it cannot be mistaken for the cedar pine, (*p. inops*,) the only other short and two-leaved species, because of the great difference of general appearance. The short-leaf yellow pine, (*p. variabilis*,) in middle and most of lower Virginia, is the great and valuable timber pine of that region, and makes the best timber of all, because of its more resinous heart-wood and very close grain. The most beautiful and highly valued floors of lower Virginia, and which are no where equalled, are made of plank of this tree. Old trees, in original forests, are from two to three feet in diameter, and usually are mostly of heart-wood. This is very durable. But the sap-wood, if exposed to changes of moisture, soon rots, as with all other pines. Formerly, nearly all the pines of the original forests in lower Virginia, and in dry and medium or stiff soils were of this kind. But as these and other trees have been cut out, and the forests thinned, other kinds, (mostly *p. tæda*, and in fewer cases, *p. inops*,) have made most of the later growth. And still more, and almost entirely, is this the case on abandoned old fields, whereon, though speedily covered by pines, very few of this species are to be seen. Yet in the upper country, at some distance above the falls, (as in Cumberland, Amelia, &c.,) though the abandoned fields are there also occupied by a second growth exclusively of pines, yet all these are of this kind, and scarcely a tree is seen of the *p. tæda*, or the "oldfield" pine of the lower country generally. The same thing I have seen in Orange, N. C., on abandoned high land fields, near the head affluents of Neuse river.

When of recent and rapid growth, and especially when of second growth on land formerly cleared, this pine is mostly of sap-wood, in that respect like the *p. tæda*; but still the former has more heart, and is of more durability, when exposed to the weather than the latter.

The yellow pine grows, (or formerly grew,) in great perfection, but in detached and scattered and limited localities, in sundry of the upper counties east of the mountains in Virginia. But, generally, in the Piedmont region, at fifty miles and farther above the falls, neither this nor any other pine grew in the original forests. In the range of counties next below the falls, it was formerly almost the only pine, and also the most common of all trees, of the original forest growth. It lessens in quantity, or in proportion to other species, as we descend towards the sea coast, and also as we go southward. After reaching the low, flat lands near the sea coast, and the southern region where the long leaf pine first appears, the yellow pine is seen but rarely. But as far south and east as Pitt County, N. C., at one place, and in Beaufort County, near Washington, I saw that nearly all the forest pines, on some spaces, were of this species, and of large size and fine form. The spots on which they thus show, are of dry soil, and, probably, also more clayey than in general, so as to favor more the growth of this than of the long-leaf pine. Also, between Plymouth and the great swamp in Washington County, N. C., this pine, of large size, and very perfect form, and with long and straight trunks, is the main original forest growth, on level, stiff soil, which, though firm land, and called dry, is so low and moist that I was surprised to find thereon this kind of pine. These facts, and especially the last case, go to show that a close or clayey soil, or subsoil, has more power to promote the growth of this pine, than it is opposed by the increased approach to southern climate, and low and damp soil, both of which are unfavorable to this pine, and very favorable respectively, to other species. This pine is also seen, in few cases and of bad growth, in the always wet and miry, and often overflowed, swamps bordering on Blackwater River in Virginia, south of the Seaboard Railway.

Loblolly Pine. (*Pinus tæda.*) This is called "long-leaf" in the Piedmont counties of Virginia, where the "short-leaf" is common and this is rare—and "oldfield" pine in most of the lower counties, where that designation is correctly descriptive. But as both these provincial names are elsewhere applied to other pines, I prefer the vulgar name used in South Carolina, of "loblolly," which, though unmeaning, will not mislead by having more than this one application.

The loblolly pine (*p. tæda*) is rarely seen north of Washington, D. C. I saw a few on exhausted land near Bladensburg, Md., within a few miles of Washington. Pro-

ceeding southward they become more and more abundant, but do not extend westward many miles above the line of the falls of the rivers. I shall again refer to this supposed western limit of its growth, and the supposed cause of this boundary. On all the exhausted and abandoned naturally poor soils, both dry and moist, certainly, and much, also, of the naturally, good, but exhausted, south and east of this upper limit, the loblolly pine springs soon and speedily, and thickly covers the surface. With some exceptions already named, where the cedar pine is the common second growth, the loblolly pines make the almost entire, and also abundant, second growth, on these abandoned lands. In the original forests, probably, it was formerly rather a scarce tree, as it is still, where there has been not much cutting out and thinning of the natural forest. It is only as a second growth that this pine has become abundant, and only on all the poorest and worst natural soils that it has taken almost entire possession of the ground, and seems to exclude other trees, and to thrive in proportion to the base quality of the soil—and more especially in proportion to the deficiency of lime in the soil. But, also, sandy soil and warm climate are further promotive of this growth; and, therefore, as proceeding southward, through eastern North Carolina, the loblolly pine, as a second growth, thrives more and more in general. I have even seen some few large and flourishing pines of this species, on the Rocky Point land, which seemed to be certainly calcareous.

As it is a disputed question, which will be considered hereafter, whether the great Swamp or Slash Pine, a valuable tree for lumber, is of the same species, or different from this, for the present I will speak only of all such trees as are undoubtedly of the kind known as "loblolly," pines.

These make the general, and in many places the exclusive, second growth from some ten or twenty miles above the lower granite falls, to the sea coast. Within these extreme limits, almost every exhausted and abandoned space is soon covered by this growth, whether naturally poor or rich, of medium texture, or sandy, wet or dry. The only known exceptions are spots of old, cleared lands, which, from some cause, were highly calcareous, on which the loblolly pine refuses to grow; or if growing, shows plainly an unhealthy and unthrifty growth.

The cones on different trees are from 3 to 5 inches long, and from 1 to 1⅝ inches thick, (as closed.) The prickles on the seed covers, stout and strong, and not pointed very sharp. The leaves from 5 to 7½ inches long, and from 1-16th to 1-13th broad. They grow in threes, and, as I believe, universally so on trees of considerable size. But on trees of but a few years' age, of rapid and luxuriant growth, some few of the sheaths will be found to contain four leaves. But this is the exception, and a rare one. The general rule is that the leaves grow in threes. By this rule, though these trees may vary from each other in the lengths of leaves, and sizes and shapes of cones, still, all are readily distinguishable from any specimen of the short leaf or yellow pine. (*p. variabilis,*) however near such specimen may approach to other usual characteristics of the loblolly pine.

The grain of this wood is very open, the wide intervals soft, and the wood, as timber, of the most worthless description. There is very little heart-wood in large trees—none, or almost none, in the small—and the heart-wood is but little resinous, solid, or durable, as timber. The sap-wood, (when growing) seems much more resinous than the heart. Trees of two feet in diameter usually have but two to three inches of this poor heart-wood. It is only when of small growth, and but rarely then, that the trunks can be riven by wedges, without more labor than profit. When split before growing too large, and after being seasoned or well dried, this wood makes quick burning fuel, of which immense quantities are sold to the north, as well as at home, for the furnaces of steam engines and other uses.

Worthless and despised as is this tree for timber, and for most other uses, it is one of the greatest blessings to our country. It rapidly covers, and with a thick and heavy forest growth, the most barren lands, which otherwise would remain for many years naked and unimproved by rest. By the fallen leaves, which from this tree are very abundant, the impoverished soil is again supplied with the deficient vegetable matter, and, with other aid, may be restored soon to fertility. And the crop of wood, where near enough to market, may be worth three-fold of what would be the value of the land, if without this product.

It is not only on dry or arable land that this tree grows vigorously and to a large size. Such may be seen on land much too wet for tillage, and two low for drainage—as on some of the abandoned lands near Lake Mattimuskeet, where the surface of the ground is not more than 18 inches above that of the adjacent waters of Pamlico Sound—and where, also, the salt water is raised by violent winds and strong tides still higher, and sometimes so as to cover the land on which the pines stand. The power of these trees to resist such unnatural visitation and changes of condition, and without apparent injury, is remarkable.

The Great Swamp Pine; or, the Naval Timber Pine. The Slash Pine.—During my first visit to the low lands of North Carolina, bordering on Albemarle Sound, in 1856, I first heard of and saw pines of unusual large sizes and peculiar character, and which were understood by all of the most experienced and intelligent lumber-cutters to be of a different kind from any of the species I have described, or any other known in North Carolina or Virginia. My principal source of information and instruction, in regard to this pine, was Edward H. Herbert, of Princess Anne, a gentleman of much intelligence, and who has for twenty years been principally and very extensively engaged in contracts to supply to the navy yards of the government, timber suitable for the construction of ships of war. In this business he has examined the whole country and has bought, cut and supplied to the government naval stations, much of the largest and best timber, (such only being fit for the masts and other spars of the largest ships of war,) that could be procured in lower Virginia and North Carolina. He has found no pines of any kind except of that now under consideration, large enough and having enough of heart-wood, to make the masts, spars and other timbers, of the largest required size. It should be observed that the proposals advertised for, to supply, by contracts, timber for the United States navy yards, mention and recognize but two kinds of pine timber, "white" and "yellow pine." The former is of the northern white pine, (*p. strobus*,) and the latter designates especially the long-leaf southern pine—but which in usage includes also the short leaf yellow pine, (*p. variabilis*,) and the great pine now to be described. This tree grows only on low and moist land, and is the better for timber, and grows larger, in proportion to the greater richness of the land. It is the principal and largest timber pine in the original forests of all the low, flat and firm, but moist lands, bordering on Albemarle Sound, and also farther South—and I have seen it growing as well, but much more sparsely, on the rich swampy borders of the Roanoke, and in the best gum lands bordering on the Dismal Swamp, and some on the low bottom lands of Tar River. Among the other gigantic forest trees on the rich and wet Roanoke Swamps, (on the land of Henry Burgwyn, Esq.,) mostly of oak, gum, poplar, &c., the few of these pines which yet remain, tower far above all others, (twenty feet or more,) so as to be seen and distinguished at some miles distance. I have visited several standing trees and the stumps of others that had been cut down, which measured either nearly or quite five feet in diameter, and were supposed to have been from one hundred and fifty to one hundred and seventy feet in height. But the sizes and heights of the trees may best be inferred from the list below of hewn (or squared) stocks, which was furnished to me from Mr. Herbert's timber accounts. These stocks were cut in Bertie, N. C., made the whole of one raft which was then (May, 1856,) on its passage through the Dismal Swamp Canal to New York. The stocks were thence to be shipped to Amsterdam for naval construction, under a contract with the Dutch Government.

	Length.	Inches Square.	Number Cubic feet.
1	47	25	204
2	66	19	165
3	86	30	537
4	79	31	527
5	88	23	337
6	65	20	181
7	74	26	347
8	80	26	376
9	68	24	272
10	58	22	195
11	86	30	537
12	58	30	363
13	74	26	347
14	74	26	347
15	70	28	381
16	70	27	368

But even the longest of these stocks do not approach the magnitude of one which was cut at a previous time in Bertie and

sold in New York by Mr. Herbert. This was eighty feet in length and thirty-six inches square at the lower end. He sold it to a dealer for five hundred dollars, and the buyer re-sold it for six hundred dollars. This stock did not retain its stated diameter (at the butt) to its upper extremity, but was there from twenty-eight to thirty inches square. All these stocks were nearly all of heart-wood. It is required that two-thirds of the surface of each side of every stock shall be of heart-wood. Of course this condition permits but little sap-wood, and that only in the angles of the squared stocks. Thence, also, it follows that the proportion of heart-wood in these trees must be very large. The timber must be resinous or it would not be good, and it must be durable, or it would not serve for the masts and other great spars of ships of war, exposed to alternations of wetting and drying, and for which the best materials only are permitted to be used. The grain of this heart wood is not generally very coarse, but more so than the long leaf, and still more than the short leaf yellow pine. Mr. Herbert, the better to aid my investigations, procured from the navy yard of Gosport, a thin cross section of the stock used for a mast of the U. S. war steamer Roanoke, which also he had cut in Bertie. The section is of the stock hewed to twenty-seven inches square, and of which but a very little sap-wood was in the two corners of one side only. As the tree was not entirely straight, the centre of the heart is thrown considerably to one side of the centre of the end of the stock, where the section was cut off. The heart wood was 34½ inches diameter, and contained 186 rings, (as measured and counted on the wider side, or radius, which, from the centre of the heart, measured 17¼ inches.

The remaining sap-wood, 3½ inches, contained 116 rings, or 32½ average to the inch.

Whole number of rings left visible in the stock 302.

A radius of three inches from centre, of heart-wood, took in 19 ring marks.

A radius of six inches from centre of heart-wood, took in 34 rings, or 5⅝ average to the inch.

The outer inch of sap-wood, (not outside of the tree,) 49 rings.

The outer rings in the sap-wood, visible in the corners, were so very close as to be indistinct; and, perhaps, some of them were omitted in the counting, though the examination was aided by a magnifying glass. In addition, and which makes a much larger omission, neither corner extended to the outer part of the sap-wood of the tree; and, therefore, if only an inch was cut off, it made the loss of at least fifty rings and years' growth. It is probable that this tree had considerably more than 300 rings, indicating as many years of life and growth. How much older must have been the tree which made the largest stock named, or other trees of five feet or more in diameter!

With such size and value of this tree, and such marked differences from every other pine known in the same region, it is not strange that nearly all opinions of the residents, and of those of most practical acquaintances with pines and their timber, should have agreed, and without exception or doubt, that this was a peculiar species. So I learned from every source of instruction, and so I believed until recently, when the comparison of all my information and personal observations made me not only doubt the fact of this being a distinct species, but induced me fully to believe that this tree, of the most magnificent and superior size and valuable and remarkable qualities for timber, is identical in species with the universally despised loblolly pine, which is almost without heart-wood, and is the most worthless and perishable material for timber; and that great age and slower growth, and in some measure a better and a moister soil, are all that have caused the different qualities and the great superiority of the old swamp pines. I know that this opinion would be deemed absurd by persons the most acquainted with these different trees and their timber. I will proceed to state the grounds for my change of opinion.

When, at first, fully believing (as instructed by others) that this swamp pine was a different kind, it was necessary thence for me to infer that Michaux, who personally and carefully examined so many of our forests and trees, and also all other botanists, were ignorant of the existence of this noble tree, which exhibits its superior magnitude over so much extent of our country. It is probable, indeed, that even the laborious and careful Michaux did not, in his travels, pass through, even if he entered, the lowland region on and near the Albe-

marle Sound—a region which is still almost a *terra-incognita* to all other persons than the residents and near neighbors. For if these trees had been seen on the natural soil, in their most perfect conditions of size and value, whatever might have been their species, they could scarcely have passed, as they have done, without being mentioned by any botanical writer. If not the *p. tæda*, these trees cannot belong to any other of the species of this country; and, therefore they would the more attract a botanist's attention, and induce particular notice and description, as presenting a new and before undescribed species—or at least new in this locality. And if they had been observed, and recognized as the *pinus tæda*, a scientific observer, like Michaux, could scarcely have omitted all notice of the remarkable differences between these large and valuable timber-trees and the ordinary and understood general character of that well known species. If the usually accurate Michaux had known this tree, its great size and value for timber, and its preferred moist and rich soil—and if he had also known that it was the *pinus tæda*, or loblolly pine—he could not have used the following expressions, in describing the latter species, as he has done, without limitation or exception. He says of the loblolly pine: "In the lower part of Virginia, and of North Carolina northeast of Cape Fear River, over an extent of nearly two hundred miles, it grows wherever the soil is dry and sandy." And again: "It exceeds eighty feet in height, with a diameter of two to three feet," &c. "In trunks three feet in diameter, I have constantly found thirty inches of the sap-wood, and in those of a foot in diameter, not more than an inch of heart." "The concentrical circles of the long-leaf pine (*p. australis*) are twelve times as numerous in the same space" [as of the loblolly pine]. "This species is applied only to secondary uses [for inferior purposes]; it decays rapidly when exposed to the air, and is regarded as one of the least valuable of pines. Though little esteemed in America, it would be an important acquisition to the south of Europe," on account of its rapid growth and fine appearance, and use of the timber for "secondary" purposes.

The only pines of the higher range of country which resemble, or even approach, the lowland swamp-pine, in character, is what is there called the "slash pine," common in the higher tide-water counties, and growing on high land, but only either in the narrow, oozy bottoms, or in the forest "slashes," or shallow depressions of the table or nearly level ridge-lands. These depressions have a close and stiff, though still sandy, soil and subsoil, serving to hold the rain-water and to convert the depressions to shallow ponds in wet weather, in winter and spring, until the collected rain-water evaporates in summer. In these very limited spaces, only, grow the few slash pines—of large size, and of coarse-grained, but durable and large, heart-timber. This, and also the swamp-pine of the low country, have their leaves in threes, and both the leaves and cones of the like sizes and general appearance with those of the common loblolly pines. For want of botanical knowledge, or any aid of instruction from others better informed in these respects, I could not compare these trees by their marks of botanical description and distinction of species. Experienced lumber-cutters can readily distinguish these trees by their general appearance, in respect to their value and fitness for timber; but I have found no one who could certainly distinguish them by any differences of their growth, and the sizes or shapes of their leaves or cones, from the *p. tæda*. Further, no one can certainly designate either a young swamp or slash pine. They are only known as such when old enough to have large heart-wood.

If the loblolly pine will become by sufficient age on rich soil, a "swamp pine," it may seem very strange that even the largest of the former (known to be the loblolly) never show large heart-wood. But nearly all these largest trees are of second growth, on abandoned fields, and few have ever reached sixty years old before the land is again cleared. And even if left to stand much longer, which I have never known, no second-growth pine can date farther back than the exhaustion and abandonment of the earliest cleared lands, or about two hundred years. In the case of the pine for the mast of the Roanoke, the latest found ring of heart-wood is certainly of growth one hundred and sixteen years old, at least. Of the few loblolly trees (admitted to be such) standing in original forests, the growth was slower, and, for their size, their heart-wood is of larger size than those of second growth, on land formerly under

tillage. Some of these trees will be offered as examples; and, in some cases, it would be difficult even for a timber-cutter to pronounce whether particular trees, which will be named, should be classed as old loblolly pines, or swamp or slash pines, (according to localities) too young, or of too rapid growth, to have large hearts, or to be good for timber. Even where the best of these swamp pines are cut, there are some trees of so much smaller-sized heart-wood that the cutters have found it necessary to designate them by such terms as "yearling [*i. e.* young] swamp pine," and "bastard swamp pine." All these things go to confirm my position, that there is no specific difference between the loblolly and the swamp and slash pines.

The dimensions, &c., of sundry trees of this species, which appear in the following statement, with but one exception, were observed and noted by myself. The list includes trees of second growth, which all persons would pronounce to be loblolly pine; others, of original growth, which are undoubtedly such as are deemed swamp or slash pines, and good timber-trees; and others, which it would be difficult for those persons who maintain there are two kinds to say to which they belong:

	Number.	DESCRIPTION OF SOILS.	Diam. of trunk (exclusive of bark) at height of stump.	Diameter of heart-wood.	Total number of rings in tree, at stump.	Number of rings in heart-wood.	Maximum width of rings (in heart) to inch.	Minimum width of rings (in sap) to the inch.	Number of rings in outside inch of sap-wood.	REMARKS.
2d growth.	1	Dry, sandy slope.	20	2	48	7	1–2	1–6	6½	Formerly cultivated and worn out; still poor.
	2	Dry, sandy slope.	21	4	44	8	..	..	8	
	3	Dry, sandy level.	10	0	..	..	..	..	..	
	4	Dry, sandy level.	11	1¾	..	..	..	..	..	
Forest Land never cleared.	5	Dry, sandy slope.	17½	2	40	3	..	..	..	Land, less than medium fertility.
	6	Dry, sandy slope.	22½	6	48	7	1–2	1–14	12	
	7	Dry, sandy slope.	19	4½	49	5	..	..	15	
	8	Level, rather moist.	18	5¼	75	7	1–2	1–30	..	Not oozy, but would require draining if tilled.
	9		21½	9	74	18	3–5	1–30	12	
	10	Sandy and oozy.	21½	6	58	13	1–4	1–13	6½	On flat at foot of, and near to, oozy hill-side. All the above in Hanover.
	11	Sandy and oozy.	32	8	95	32	1–3	1–16	9½	
	12	Sandy and oozy.	21	6	96	43	3–20	1–25	12	
	13	Stiff, sandy bottom.	26½	9¾	97	28	..	..	16	Prince George County.
	14	Oozy slash.	39	32	141	63	3–5	1–28	17	Tree 130 feet high—Hanover.
	15	Oozy slash.	37½	27½	204	85	1–4	1–18	15	Tree 110 feet high—Hanover.
	16	Oozy slash.	37½	31	269	187	1–5	..	66	Hanover.
	17	Low, but firm, sandy.	42	35¼	283	207	..	..	..	Tree 148 ft. } Washington co., N. C.
	18	Firm, low and moist.	60	47	280	170	..	..	..	Tree 170 ft. } Washington co., N. C.
	19	Low and rich.	41	34½	302	186	1–3	1–60	49	Mast of the Roanoke steamship-of-war, from Bartie, N. C.
	20	Firm, low, moist.	46	39	...	184	..	..	..	Near Tarborough, N. C; these dimensions at 30 feet high—the lower part having been removed for timber, and stump damaged.

The trees numbered 14, 15 and 16, may unquestionably be put with the "swamp pines" of the low country. Those numbered from 7 to 12, of much less age, only approach, in sizes of heart-wood, to good timber, which they might have attained to, if left to grow two more centuries.

It is not only the loblolly pine that is extremely deficient in heart-wood until of advanced age. Though in less degree, this defect is often found also in the short-leaf pine, (*p. variabilis*) which, generally, is the best yellow pine timber-tree of the higher country. Some trees of this kind, of original forest growth, of twenty or more inches in diameter, have less than four inches thickness of heart. If of second growth, these trees would have had still less of heart generally.

It is not always plain where to fix upon the dividing line in a tree, between the heart and sapwood; nor is the line of junction always regular or parallel with the rings of grain near the earth. Also, in trees like No. 16, which are nearly all of heart-wood, the little sap is so resinous that it can scarcely be distinguished, except as being living wood, when the tree is first cut down.*

Pond Pine. Pinus Serotina.—Michaux says that this pine is "rare and fit for no use"—and states the "ordinary size, thirty-five to forty feet in height, and fifteen to eighteen inches in diameter." By these and other indications, I sought in vain for this pine, by such slight and distant observation as is afforded to a traveller, through wet lands,—and in some cases failed to distinguish it, even when my later and more close inspection showed that it formed the principal, if not the sole forest growth for miles together. This great oversight was caused to me by the inaccuracy of Michaux's description of the height, and also by the actual general resemblance of the trees to the *pinus tæda*. And between these two, as species, the residents best acquainted with both have not observed any difference. It is not true that, differences of general appearance, and of growth, are recognized by all—and even a different name, the "savanna pine," is commonly applied to the species now under consideration, where the trees make the general growth, on the wettest savanna or boggy swamps. But the usual smaller sizes, and

* Whilst engaged in the investigation of this subject, and particularly as to the question of the species of the valuable "swamp pine," and its being identical in species, or not, with the worthless "old field" or loblolly pine, I sought scientific information from Dr. James F. McRee, of Wilmington. No person was better qualified to instruct, and to decide doubts, on this question, than Dr. McRee—not only because of his extensive botanical knowledge, but, also, as being a native and long resident of the region in which these pines (generally supposed of two different kinds) grow in great number and in their greatest perfection of size and luxuriance. Failing to find him at home, I made my inquiries by letter, and subsequently received from him, though after this writing was completed, full confirmation of the correctness of my position—that the above trees, deemed so different by all lumber-cutters, are the same. The question of identity had previously attracted Dr. McRee's attention, not only as a botanist, but as a proprietor of pine forest, in which these trees were abundant, and of which it was important to designate those best for timber and for sale. He says, in his letter, that "both kinds [deemed the most distinct and altogether different by all lumber-cutters and carpenters,] when subjected to the closest botanical scrutiny, show no signs of specific difference. Of this you will be better assured, when I inform you that I have recently had the pleasure of a visit from the Rev. M. A. Curtis, (than whom there is no better botanist South of the Potomac) when we examined together two varieties of the *p. tæda* spoken of, and he unhesitatingly agrees in opinion with me as to their identity." "You will find the two varieties of the *p. tæda* recognized by Elliot, who calls the 'swamp pine' *p. tæda*, and the 'loblolly' *var. Heterophylla*"—[which latter is recognized by all other botanists as simply *p. tæda*.]

Dr. McRee says that the experienced timber-cutters profess to be able to distinguish, at the first glance, the difference between the two (so-called) kinds of pine. And this they can generally do, from external signs—that is, they can judge whether a standing tree has much heart, [which they would call "swamp pine" generally, but to which, near Wilmington, they give the name of "rosemary pine," which elsewhere is given exclusively to the *p. variabilis*,] or but little heart, in which case they call it loblolly. But, by external examination, with the aid and direction of one of the most experienced and intelligent lumberers, who was fully satisfied of the difference of these trees, and of his ability always to designate them, Dr. McRee found that even the actual and *only* differences, as to the size of heart-wood and the comparative value for timber, in numerous cases, could only be determined by applying the axe, and so reaching the heart.

apparently more imperfect or stunted growth, and ugly shapes of the "savanna pines" are ascribed to the exposed unfavourable and unnatural situation in which they stand, in mire and water, and not to any fixed difference of kind, between these and the *pinus tæda* on dry or dryer soils. Indeed, the cones furnish the only certain indication of the pond pine. They remain on the tree, and unopened, for six months (or perhaps a year) after ripening—are very compact, and some of them (but not always, as we would infer from the description and figure given by Michaux,) are perfectly egg-shaped. But more generally, while they approach this shape, they are rather broader near the base, and more pointed at the top, so as to be about midway in shape between conical and oval. The cones, three or four together, often grow out from and surround a twig. Their close surface, and their remaining closed so long, and also their peculiar forms make these cones more beautiful than any others. The cones, and especially those in clusters, would be valued as mantel ornaments. The cones are about two and a half inches long, and one and seven-eights broad. The leaves grow in *threes*, and are from five to seven inches long; and very like those of the loblolly pine. I have never met with these pines in Virginia, though, from description, I infer that they are found, in numbers, in parts of the Dismal Swamp. I first was enabled to recognize and identify the tree, as the *pinus serotina*, in the low swamp lands north of Lake Mattamuskeet, along the canal to Alligator River. There it grows in considerable numbers, mostly from eight to twelve inches in diameter, and rarely eighteen. They form the sparse but unmixed forest growth on large surfaces of wet savanna land on both sides of Pungo river. These were peat lands, which had been burnt over, and are so low and wet as to be deemed worthless. But, also, on the rich swamp land near Lake Scuppernong, (the farm of Charles Pettigrew, Esq., in Tyrrel County,) which had not yet been brought under culture, and which had been burnt over and left naked, many years ago, the next succeeding forest growth was wholly of the pond pine, and of which many of the largest appeared to be eighteen inches in diameter, and eighty feet high. Also, on the thinner swamp soil near the canal of Mr. McRee, in Washington County, (near Plymouth, N. C.,) the general forest growth, for a mile or more, and generally of large size, is of this particular pine. Yet neither Mr. McRee, nor any of the neighbouring residents, had suspected that these trees were of different species from the ordinary loblolly or "old field" pine; and under this mistaken impression, this body of swamp land is generally supposed to be of little fertility, because covered (as supposed) by a growth, which indicates poor land. I do not pretend to pronounce, on my very cursory view, that this land is not of inferior fertility—nor that the pond pine may not grow on poor land, provided it is peaty and very wet. But, this pine growing and thriving, and either generally or exclusively making the forest cover, is certainly no indication of poor soil, because it grows thus on the richest, of which the case cited above of the Scuppernong swamp land is full proof.

This tree has more heart, and more resin in its sap-wood, than the loblolly; and very different from the latter, the pond pine furnishes good and durable timber, for such purposes as the small trunks will suit. Masts for small vessels are made of those growing on the low and wet swamp of Mattamuskeet. As a wet (and perhaps, also, a peaty,) soil is most favourable, if not essential, to the growth of this pine, it is probable that on the wettest land it may have the most heart-wood, and serve for the best timber. Where it grows on dryer (though still wet) land, near Lake Scuppernong, it had been understood that this pine had more heart-wood, and was of more value, than the *pinus tæda* of the neighbouring dry and poor lands—but the superiority was not so marked, or appreciated so highly, as I heard of in other places, where the pond pines grew on much wetter lands.

Pitch Pine. Pinus Rigida.—I have seen and recognized this tree (as supposed) in but very few cases in Prince George's Co., Md., and in Culpeper, Va. But all that were observed were trees of young growth, and therefore the only indications of the kind were in the leaves and cones. The trees which I saw and supposed to be of this kind, had leaves thicker and more rigid than usual of other common kinds, three to four inches long, and growing in *threes.* The cones (in Maryland) about two inches long, and as seen open, nearly

spherical in general outline. In our Alleghany region, this tree supplies much of the pine timber used in buildings, and in planks exposed to view, would attract notice by the great number of knots. But except in small trees, which only were accessible to me, and which do not offer good and reliable specimens of growth, &c., I had no opportunity for fully examining the growing trees, and comparing them with others. I have never (with certainty) seen and known this tree in lower Virginia or North Carolina.* But as it would seem from some of Michaux's words that it is in this region, and as, possibly, I may even have seen trees of this species without distinguishing them from some other kind, I will abridge the description given in the American edition of Michaux's work. Some passages of this description seem to contradict others, to which contradictions I will invite notice by marking them in italics. Michaux says of the *Pinus rigida* that it is "known in all the United States by the name of 'Pitch pine,' and sometimes in Virginia as 'Black pine.' *Except the maritime parts of the Atlantic States,* and the fertile regions West of the Alleghany mountains, it is found throughout the United States, but most abundantly *upon the Atlantic Coast,* where the soil is diversified, but generally meagre." "In Pennsylvania and Virginia the ridges of the Alleghanies are sometimes covered with it. Near Bedford in Pennsylvania, where the soil is more generous, the pitch pine is thirty-five to forty feet high, and twelve to fifteen inches in diameter." "Its most Northern localities are Maine and Vermont, where it does not exceed twelve to fifteen feet high." "*In lower parts of New Jersey, Pennsylvania and Maryland,* it is frequently seen in the large swamps filled with red [white ?] cedar, which are constantly miry, or covered with water; in such situations it is seventy or eighty feet high, and twenty to twenty-eight inches in diameter."—"It supports a long time the presence of sea-water, which, in spring-tides, overflows the *salt meadows*, where sometimes this tree is found alone, of all its genus." The buds are always resinous, and its triple leaves vary in length from 1½ to 7 inches, according to the degree of moisture of the soil."—"Size of cones depend on nature of the soil, and varies from less than one to more than three inches in length. They are pyramidal in shape, and each scale is pointed with an acute spire about two inches [lines ?] long." A note to this text of Michaux, by J. J. Smith, says that the *p. rigida* sometimes attains the height of 100 feet, and four or five in diameter.* J. J. Smith also adds a characteristic of this pine, which I have not known in any other. "It differs from other trees of this family in its stump throwing up sprouts the spring after the tree has been felled; but these do not attain any considerable height. The fallen trunk also throws out sprouts the succeeding summer."

Michaux further says that the *p. rigida* is remarkable for the number of branches which occupy two-thirds of the trunk and render the wood extremely knotty. The concentric circles widely distant; three-fourths of the larger stocks consist of sap. On mountains and gravelly land the wood is compact and surcharged with resin; in swamps it is light, soft, and composed almost wholly of sap. From the most resinous stocks is procured the lamp-black of commerce. Tar is made of this pine in the Northern States and Canada, as it is of the *p. variabilis* in lower Virginia.

Perhaps the foregoing description may enable some observer to be more successful than myself in finding and distinguishing this pine in the low country of Virginia or North Carolina. Also it may prevent from being confounded with this pine either the *p. serotina* (which Michaux says "strikingly resembles" the *p. rigida,*) or the *p. tæda,* when in low and wet ground, or exposed to wet, or sometimes reached by salt water.

Having now described separately each species of this region, and some others for better distinction, I will return to more general remarks, or the consideration and

* I have since seen a few young trees of this species in Albemarle, on the road from Charlottesville to Ridgeway on the Rivanna. These compared to the surrounding and ordinary growth of *pinus variabilis*, were very different—and especially in the much thicker and more rigid leaves of the *p. rigida*—and also in the general appearance, in tint and outlines, of the two kinds of young trees.

* This statement of sizes, induces a suspicion that the writer, (Smith,) had mistaken the great swamp pine (*p. tæda*,) for the *p. rigida*.

comparison of different species in connection.

The short leaf yellow pine, (*p. variabilis*,) is the principal tree of the original forests of the upper range of the tide-water region of Virginia, and also above the falls as far up the country as the usual growth of any pines extend continuously. For, at some distance above, as supposed from change of soil, the entire growth of pines ceases and gives place to a general growth mostly of different kinds of oak. Proceeding South-eastward to the low and wet country, this pine becomes more scarce, and is more and more substituted by the swamp or loblolly pine as original growth; and more Southward and on higher lands, and throughout Eastern North Carolina, the long leaf pine generally is the principine of the original forests. When any of these several forest growths were cleared off for tillage, and the lands were afterwards worn out and then thrown out of cultivation, several different pines in different places, as second growth, entirely occupy these second lands, and in most cases the second growth is entirely different in species from the pine of the first growth. Thus, in nearly all of the tide-water region of North Carolina and on most of that of Virginia, the almost universal second growth pine is the loblolly, or "old field" pine, as thence called, which succeeds to the original short leaf pine below the falls in Virginia, (and also for a short distance above) and also to the original long leaf pine. in North Carolina, and occupies, exclusively, in the abandoned former places of both, the ground which this pine had originally, but partially shared with the short leaf and other trees. In the Northern Neck of Virginia, on some other lands near to rivers, and also in the more Northern counties above the falls, (as Fairfax,) the cedar pine (*p. inops*) is the principal second growth, or is the "old field" pine of those lands. Further, the Southern and lower Piedmont lands of Virginia, but not so low as the line of the falls, when abandoned, also are covered and exclusively with *their* "old field" pine, and which is so termed in Amelia, Cumberland, and that range of counties, and in Orange, in North Carolina. But the second growth pines of this higher range of country is not like that of the lower range, but is no other than the short leaf yellow pine, (*p. variabilis*.) Thus it is, the loblolly, which is the almost entire second growth of nearly all the tide-water region, refuses to grow at a short distance (generally varying from five to twenty miles) and at an irregular line of termination, above the falls, while the short leaf pine continues thence and covers all the abandoned fields for some distance farther up the country, after which that particular pine growth also ceases. Yet, because of the same name of "old field" being used in both places, many farmers and residents suppose both pines to be of the same species. And very many farmers of the lower country where the first and second growth pines are of different species, (*variabilis* and *tæda*, respectively,) suppose them to be the same kind, but altered in appearance and manner of growth by the difference of the lands and other circumstances. Of these facts, in regard to remote localities, I have to rely more on information than on my own limited personal observation. But in Prince George and Hanover counties, in which I have resided, and in more of the upper and middle range of the tide-water country, I have seen much, and have noted such general facts as these: In the original forests of the ordinary poor soils, or of medium fertility and dry land, not one pine tree in fifty is a loblolly, and all the others are short leaf pines. And of the few loblolly pines there found, they are of smaller and younger growths, if scattered among the short leaf pines. Or if (as rarely) a number of loblolly pines are seen near together and occupying the ground either partially or exclusively, it is either when the short leaf pines had been formerly cut out or otherwise destroyed, or where the moisture of the soil forbade their healthy growth, or where the ground, (in soil, sub-soil and all below for sundry feet,) was so sandy as to be unfavourable to the short leaf pine, though not to the loblolly.

As particular observations, made with a view to certain objects, are always more accurate and reliable than far more extended and general observations made without any particular object, I have recently made for this purpose a particular examination on parts of the forest and waste lands of Marlbourn farm. First, in a body of original forest land, high, dry, of sandy soil, but having clay below, and of but moderate productive power, (or below medium fertility,) short leaf pines made the principal growth, and all of the largest pine growth.

The loblolly pines were not one to fifty of the former, and nearly all of these few were of small size. On one side of this body of old forest land is a very poor old field of similar soil, abandoned from eight to ten years past, and now covered thinly with young pines of five years old or less. (The earlier of this second growth had been cut down.) Of these young trees, perhaps one in ten to twenty is a short leaf pine, and these are always of smaller size than the much more numerous loblolly pines. On the other side of the forest land there is another small body of "old field" pine growth, the largest trees being about ten inches through, and mostly of different smaller sizes. Of these not one in three hundred was a short leaf, or any other than a loblolly pine, and the few others, of short leaf, were so small that if all are let alone to stand, these last will certainly perish, because being so over-topped and shaded by the others of much larger sizes and greater vigour of growth.

From these and other more general observations, it would seem that in this region the loblolly pine was more lately introduced (or the winged seeds transported here from abroad by the winds,) than the short leaf, and could not obtain a proper seed-bed and maintain a healthy growth in lands already and completely occupied by other established pines and other trees. But when worn out vacant lands were offered, the opposite result followed. The seeds of both these kinds of pines were everywhere numerous enough, and were so readily transported to great distances by the winds, that there was no deficiency of either kind on any land. But, in such vacant fields, or when these two kinds of pine were equally in possession, the loblolly pine is much the fastest grower, and in a few years over-tops the smaller short leaf pines, which, therefore, are unthrifty, and in time are overpowered and die under the shade and crowding of the large and more vigorous loblolly pines. Hence, in a thick and long standing second growth, however numerous the slower growing short leaf pines may have been at first, not one might live when the eldest of the others had reached to forty years. On the particular abandoned lands where pines of second growth thrive best and grow fastest, they usually stand so thick, when young, that many of the smaller and weaker necessarily must die, and thus make room for the more vigorous. In such cases, of course the short leaf trees, of slower growth and smaller size, would certainly be among the first to perish. It is only when the growth is thin, owing to some unfavourable conditions of the soil, that in this region the short leaf pine can live in numbers, intermixed with the loblolly, as second growth; there being, in that case, enough space for both to live.

But in the higher range of country other causes operate. The land there is naturally much richer than the dry land in the lower country, the soil red, more clayey, and having not enough acid, (or having too much lime,) to permit the growth of the loblolly pine, which is especially favoured by the most acid soil, and also by sandy soil. But the short leaf pine can grow and thrive on soils stiffer, richer and better constituted for fertility, and therefore can occupy such land to the entire exclusion of the loblolly pine. But still, even the short leaf species does not thrive as well on a good agricultural soil not very deficient in lime. Therefore, according as the soil is better constituted for tillage crops, these pines are more sparse and slow in growth, and on the best natural soils they will not grow at all, as on the South West Mountain lands and the limestone soils of the more Western mountain country, and rich alluvial bottoms everywhere.

I will here present an opinion on this subject which will not be maintained by argument, to do which would require too much space, and would be here out of place. This opinion is, that the soils and upper layers of all the tide-water region of Virginia and North Carolina, and also an adjacent strip, of irregular breadth and outline, above the falls, are of drift formation, the materials of the drift having been washed by an enormous flood from the lands lying above, and which were denuded in supplying that material. That the whole region so formed by drift is extremely deficient in lime, (and much more so than the denuded region above,) and therefore naturally acid, consequently especially favourable to the growth of loblolly pines. If this opinion is correct, it will be much more important than merely for assigning the necessary localities and actual limits for the healthy growth of loblolly pines. For the ascertaining the limits of the drift formation and the places where it is present

or absent, will serve to indicate where lime, as manure, will either be highly beneficial, as in all the low country, or where it will probably be of little benefit, or none, as is said to be generally the case on the red Piedmont lands. This subject of drift formation and the drift-formed region and its localities, I have treated at length elsewhere, and therefore I will pursue it no farther here.

From the various facts and opinions stated in the foregoing pages, it will have appeared incidentally that some (if not all) of the species of pines, are especially good and reliable indications of the character and constitution of the soils on which they grow, and in some cases of climate also. Thus all the pines common in this region, prefer to grow on soils, if dry, of but moderate or a low degree of natural fertility. The white pine (*p. strobus*,) which, however, is not of either the lowland or the Piedmont region, is the only species known to prefer well constituted, rich, and also dry agricultural soils. The long leaf pine, (*p. australis*,) requires a Southern locality or climate, and with that, a dry, sandy, and poor soil, and also sandy sub-soil, and its healthy and general growth is an indication of the presence of all these different requisites. The short leaf pine, (*p. variabilis*,) prefers stiffer soil or underlying earth, both to be dry. This will bear more of lime in the soil than either the preceding, (except *p. strobus*,) or than the loblolly. The cedar pine, (*p. inops*.) is more rare, and its habits less known to me. But this would seem, (as a second growth,) to prefer and indicate still better original soils, however exhausted subsequently, than either of the preceding pines of this region, and also of more clayey constitution. The loblolly grows well both on dry, sandy and poor soils, and on moist, deep and rich soils. But in both of these very different positions it must have acid soil. And this last condition is caused and provided by the great deficiency of all forms of lime in the poorest natural soils, and also by the great excess of vegetable matter and swampy or peaty lands.

Time is the most precious, and yet the most brittle jewel we have; it is what every man bids largely for, when he wants it, but squanders it away when he gets it.

How to Improve Cider.

Prof. Horsford, the chemist, has recently communicated to the Massachusetts Horticultural Society a recipe for the improvement and preservation of cider, which he recommends to general trial. It is as follows:

"Let the new cider from sour apples—sound and selected fruit is to be preferred—ferment from one to three weeks, as the weather is warm or cool. When it has attained to lively fermentation, add to each gallon, according to its acidity, from half a pound to two pounds of white crushed sugar, and let the whole ferment until it possesses precisely the taste which it is desired should be permanent. In this condition, pour out a quart of the cider and add for each gallon one quarter of an ounce of sulphate of lime, known as an article of manufacture under the name of 'anti-chloride of lime.' Stir the powder and cider until intimately mixed, and return the emulsion to the fermenting liquid. Agitate briskly and thoroughly for a few moments, and then let the cider settle. The fermentation will cease at once. When, after a few days the cider has become clear, draw off and bottle carefully, or remove the sediment and return to the original vessel. If loosely corked, or kept in a barrel on draught, it will retain its taste as a still cider. If preserved in bottles carefully corked, which is better, it will become a sparkling cider, and may be kept indefinitely long."—*N. Y. Observer.*

Palpitation of the Heart.

At one of the meetings of the Physico-medical Society at Wurzburk, Prof. Kolliker communicated that he had found a remedy to relieve in certain cases morbid palpitation of the heart. Reasoning from the experimentally established influence of the severe and constantly returning palpitation, to relieve it by deep inspirations and subsequent holding of the breath. The advice was followed by good effect, a few deep respirations and moderate holding of the breath sufficing to arrest the palpitation for one or two days. Prof. Bamberger remarked that the expansion of the lungs, causing them to overlap the heart more fully, might render the palpitation only less perceptible, without actually arresting it. To this Kolliker replied, that it was improbable, because after a few deep inspirations palpitations had ceased, which otherwise had lasted for hours.

[*Medical and Surgical Reporter*

For the Southern Planter.

Ice-Gathering.

HANOVER COURT-HOUSE,
Dec. 31, 1858.

Editor of the So. Planter,

SIR—The peculiar character of the winter thus far having produced some uneasiness in regard to the ice crop in the vicinity of Richmond, I send you, as likely to be interesting to your readers, memoranda from my journal of the dates of ice-getting for the past six seasons, premising, however, that after the ice is one and a half inches thick, I never allow the freeze to pass without getting what I can. For the two first seasons I filled one house; since then, two.

Your obedient servant, X.

—

1853—Jan'y 21,	2 @ 3½	inches	thick.
29,	3	"	"
1854—Jan'y 4,	4 @ 6	"	"
Dec'r 23,	1½@ 4	"	"
1855—Jan'y 31,	2	"	"
Feb'y 5,	2	"	"
" 8,	3	"	"
1856—Jan'y 3,	1½	"	"
" 10,	9	"	"
" 11,	9	"	"
" 14,	10	"	"
Dec'r 24,	3½	"	"
" 30,	5	"	"
1858—Feb'y 17,	2½	"	"
" 23,	4	"	"

For the Southern Planter.

A CARD.

COMMUNICATED BY MESSRS. FOWLE & CO.

Near Ivy Depot, Albemarle Co.,
Dec. 25, 1858.

Dear Sirs—Yours of 11th instant, asking me to give the result of the application of Sombrero Guano procured of you last Spring, was duly received, and thinking I would learn of my neighbours the result of their application, delayed my reply till now. I have, however, seen no one who used it but Mr. Raleigh Colston, who had also received a letter from you, and spoke of replying very soon.

I applied from 250 to 300 pounds of a mixture of Peruvian and Sombrero Guano, mixed in the proportion of one bushel by measure of Sombrero to two of Peruvian. The first weighing 90 pounds to the bushel, the last from 57 to 60. On similar soil, immediately adjoining, I applied about 12 bushels of Bone Dust and 150 pounds of Peruvian to the acre. The land where this last application was made was planted first, manured with farm pen manure, prepared and hilled first. The crop was better where the mixture of Sombrero and Peruvian was applied. While the tobacco crop is so frequently affected by a variety of circumstances, apparently trivial and slight, such as the time of working it, the season for planting, the condition of the weather, immediately afterwards, &c., &c., the difference above alluded to may not have been attributable to the Sombrero Guano, still I am forcibly impressed with the result, and shall make the same application to my tobacco land next season. The land above alluded to is naturally good, being branch flats, and on all, excepting a small portion where Sombrero was used, farm pen manure was moderately applied.

My neighbour, Mr. Raleigh Colston, used no other manure but a mixture of Peruvian and Sombrero Guano, and his crop of tobacco was remarkably good, peculiarly so, considering the quality of the soil and the character of the season. Examining his crop when a good deal was ready for cutting, I frankly told him his was the best I had seen with the above qualifications. The Sombrero I procured of you last fall, I mixed in the proportion of one bushel by measure to three of Peruvian, and applied it to wheat, with the drill, excepting some land rather steep and stony where I sowed it broadcast, I can form no opinion yet of its effects, but having used some of De Burg's Excelsior, and California or Elide Island Guano, will take pleasure in reporting comparative effects.

The last ton of Sombrero you sent me was properly ground, as fine as plaster generally is. Prepared in this way, no farmer, who has any regard for economy, will purchase Manipulated Guano, when he can save at least from eight to ten dollars per ton, by purchasing the materials and making a thorough mixture, with very little trouble. On a rainy day, without a Peruvian Guano Grinder, several tons can be prepared and mixed as thoroughly on a barn floor as it can be done by any machinery whatever.

Purchasing the two guanos of you, one at $56 per ton of 2,000 pounds, the other at $28, equal parts of each mixed (that is by

weight) a ton would cost $42, and one knows precisely what the mixture is composed of.

Peruvian Guano alone cannot always be uniformly distributed with the drill, depending on its condition as to dryness, &c., and the state of the weather, but a mixture with Sombrero obviates to a great extent these difficulties. Furnishing it at the comparatively low price which you do, and prepared far superior to any I have seen ground elsewhere, I am sure you will dispose of a very large amount next season.

Most truly and faithfully yours, &c.,

JOHN R. WOODS.

Messrs. Fowle & Co., Alexandria, Va.

Cultivation of Clover.

RED CLOVER. (*Trifolium Pratense.*)

BY S. B. NOBLE.

Clover is a leguminous, biennial plant—some varieties of which are indigenous to almost all parts of the globe. Under certain circumstances it will become perennial. In England, Scotland and Germany, red clover is called an exotic, and it is difficult to say to what country it is indigenous. It has become an almost universal favorite among agriculturists in all countries; and in many portions of our wheat growing districts it is thought to be indispensable in raising a crop of that staple. As a fertilizer it has not an equal among any of the leguminous plants.

VARIETIES.

The varieties of clover are quite numerous, but as red clover is the one most cultivated, we shall confine our article to that variety. Of red clover it is supposed there are three kinds; one a large, coarse kind, the latest of the three, and of the least value; another variety is called the medium, and is the most cultivated: the other is a small variety, and cultivated to a small extent; an early, fine textured kind, but small.

OBJECT OF CULTIVATION.

There is a three-fold object in cultivating clover, viz: for pasture, for hay, and another, the most important of the three, is, for a fertilizer. It is rich in nutriment, according to Professor Johnston, who analyzed a first crop from an acre of land, and found it to contain the following ingredients:

	lbs.
Albumen, gluten and casein	430
Fat, oil, &c	143
Starch, sugar, gum and dextrine,	1,825
Fiber and husk,	1,156
	3,554

According to Boussingalt, the elements of a first and second crop of clover from an acre of land are, of

	lbs.
Carbon	2,757
Hydrogen	288
Oxygen	2,211
Nitrogen	118
	5,374

SOIL.

The soil best adapted for raising clover is an argillaceous one; a clayey loam, and one in which lime and other alkaline earths are present. Any soil that may be called a good wheat soil is also a good clover soil; because wheat possesses many of the same important ingredients, but not in the same proportion. That the alkalies should be largely in the ascendancy to constitute a good clover soil, we infer from an analyses of the ashes of clover. They contain, according to Professor Horsford,

Potash	16.101
Sodium	1.874
Soda	40.712
Lime	21.914
Magnesia	8.289
Phosphate of iron	.670
Chlorine	2.856
Phosphoric acid	3.915
Sulphuric acid	1.063
Silica	2.606
	100.000

A glance at the above shows that clover is composed of a large proportion of the alkaline earths, as lime, soda, magnesia and potash. It follows that to prepare those ingredients that they may be appropriated by the clover, sulphuric acid must be present, and without it those ingredients could never have been appropriated by the growing plant. After deducting the carbonic acid, carbon and sand, one hundred pounds of the ashes contain nearly as follows:

	lbs.
Potash	16
Soda	40
Magnesia	8
Chlorine	2
Phosphoric acid	4
Sulphuric acid	1
Silica	2

A little over one-half a ton of clover hay will produce the above. It takes one hundred pounds of clover to make eleven pounds of ashes.

MANURE.

Soils that are light and porous are generally deficient in the mineral materials, and cannot produce clover to advantage unless a proper fertilizer be applied. Ashes contain potash; plaster contains lime and sulphuric acid, and salt contains soda and chlorine. It follows that those articles are proper fertilizers for clover. Besides the inorganic material of clover, it contains starch, sugar, albumen, gluten, &c., which are composed of carbon, oxygen, hydrogen and nitrogen.—These are supplied, in part, from the atmosphere, and may be supplied, in part, by common barn-yard manure, before it has undergone much decomposition.

Plaster applied to clover fixes the ammonia; the sulphuric acid of the plaster disengages itself from the lime and unites with the ammonia, and forms sulphate of ammonia, and holds or fixes it, preventing its escape in the form of gas, till the growing plant appropriates it to itself.

TIME OF CUTTING.

The disagreement among cultivators themselves may be harmonized by a few scientific facts, which cannot be easily overlooked or evaded. The period when clover possesses the greatest amount of nutritious matter is the proper time to cut it. If cut before or after that time, some portion of its nutriment is lost.

An experiment by Professor Horsford fully settles this point. Clover cut on the sixteenth of June, at the surface of the soil, when the heads just began to appear, produced only 0.80 per cent. of sugar. Clover cut on the first of July, when the heads were fully developed, produced 1.15 per ct. of sugar; very near fifty per ct. more than that cut first.

If clover is not cut when sugar is most prevalent, it goes to perfect the seed, and the same loss of nutriment is the result. A little observation of the instincts and habits of the insect tribes will confirm any skeptical person upon this point. Bees and other insects never work upon clover before it blossoms, because sugar has not been elaborated; nor after, because it has gone to support the seed, and is not now sugar. These facts should satisfy any agriculturist as to the proper time to cut clover.

CURING THE HAY.

The water contained in green clover when first cut, amounts to from 75 to 83 per cent. It also contains a certain amount of sugar, which is easily fermented. Therefore when cut and placed in a barn or stack, fermentation will be produced, which will destroy the sugar and other nutritive qualities, and vinegar or acid will be produced, rendering the hay sour and unfit for food. If sufficiently dried, the sugar will remain with the fiber, and the hay will be a nutritious, wholesome food for stock, and supply the animals with, not only food, but an element (carbon) which will generate animal heat.

The whole plant contains 11.18 per cent. of ashes; the leaves 10.69 per ct., and the stems 8.52 per cent. All of the ingredients have more or less of valuable properties to support the animal economy. The leaves contain nearly one-fourth part more than the stem alone. They should be carefully preserved. This can only be done by carefully drying the clover before putting it into the barn. The clover may be cut and permitted to lay in the swath a few hours to wilt. Let it then be carefully put up into bunches, to remain a few days, to cure and partly dry. When it is desired to house it, let the bunches be opened and exposed to the air a few hours, and it is then fit to go to the barn. A little salt may be scattered broadcast over the layers. Never let the hay dry so much in the field as to have the leaves and heads drop off by handling or hauling.

CLOVER AS A FERTILIZER.

	Per cent.
The whole plant	1.83
The leaves	1.75
The stems	1.40

The ashes of clover contain the following per centage, by which some estimate may be made of its value as a fertilizer:

	Per cent.
Potash	12.164
Sodium	1.414
Soda	30,757
Lime	16.556
Magnesia	6.262
Phosphate of iron	.506
Chlorine	2.159
Phosphoric acid	2.957
Sulphuric acid	.801
Silica	1.968
Carbonic acid	22.930
Sand and coal	1.244

The large quantity of carbonic acid should be considered. It far exceeds the sum of all the other acids, being nearly 23 per ct. of the whole. When green clover is first plowed under, by the action of carbon, heat is evolved and fermentation begins; carbonic acid gas is formed, and passing off forms a chemical combination with the mineral or inorganic elements of the soil, rendering them fit to be assimilated and appropriated by the succeeding crop. That clover is a powerful fertilizer for wheat, and all other crops requiring lime and other alkaline earths, is admitted by most agriculturists; but at what stage of its growth it is best to do it, is yet a matter not fully settled.

Some assert that when clover is full grown it is a positive injury to plow it under; and assign as a reason that such a mass of green substance passes rapidly into a state of fermentation, and becomes so far decomposed as to produce the acetous fermentations; acid is formed before the crop can receive any benefit from the vinous fermentation. They also claim that the clover may be pastured off, and half or more of the mass of herbage be converted into manure, and left upon the soil by the droppings of the stock, and this will be equivalent to any supposed loss of the clover fed off, and a saving so far made of the amount of food taken from the field, and a further saving of the less labor required to turn under a half crop instead of a full one. Those who maintain the opposite theory claim that a full grown crop is best to plow under; assert the fact that the full grown clover containing the largest proportion of sugar, and the largest amount of herbage, it must be best. Now both of these individuals may be right, under certain circumstances, as much depends upon the season. If it be dry it may decompose less rapidly than it would if the converse were true. It will also depend upon what crop is to follow the clover. It is generally believed, upon good authority, that wheat requires a soil in which lime and the alkalies exist in a large proportion. It is also known that clover contains alkalies, or mineral earths, in abundance for any crop, and the carbonic acid of the clover will decompose them. It follows that a clover lay is a good manure for wheat.

SEEDING TO CLOVER.

There are various modes adopted to seed land to clover. Some scatter the straw evenly over the land, and say that ordinarily there is enough seed left after thrashing to seed the land with, and the straw is a benefit to the land and no injury to the wheat. Others prefer to sow the seed in chaff, and say it can be sown more evenly, and assert that the machines in which the seed is cleaned injures a large proportion of seed, and prevents it from vegetating. Others prefer to sow the seed in a clean state. Now all these methods may be good, and each individual must decide for himself as to the mode for him to pursue.

QUANTITY OF SEED.

The quantity of seed to an acre is from 6 to 12 pounds; the latter quantity we think none too much. Two pounds of it may be allowed for imperfect seed. If sown thick the hay will be finer and better, and the seed be more likely to grow, protecting each other.

TIME OF SOWING.

The practice of sowing in the spring is the most followed. Let it be done when there is snow on the ground, if such a thing can be had; it can be sown more evenly.

If we should follow the teachings of nature we should select the fall of the year to sow the seed. If sown early, it will come up and get rooted before winter sets in. If it does not vegetate in the fall it will have the benefit of the fall rains and freezing and thawing to enable it to grow early in the spring. Some few are practicing this course with success. Nature's method is to sow her seeds as soon as they are ripe. They generally vegetate and grow well, and biennial and perennial plants usually get large enough to withstand the winters. This is true with indigenous plants, and how far clover may be acclimated and become as hardy as an indigenous plant, experiment alone can determine.

WITH WHAT SHOULD IT BE SOWN?

It should be sown with some plant that will give it protection. If sown with oats, peas or barley, it is too late, and the dry weather sets in before it gets large enough to survive it, and it frequently cannot vegetate at all. Wheat having already been sown, and its leaves are sufficiently expanded to protect the young clover as soon as up; it is therefore better to sow with wheat, as being the least risk. The wheat is cut in time to give the clover a chance to mature.

SAVING THE SEED.

The old method of mowing the clover and thrashing the seed from the straw is nearly abandoned. Machines have been invented by which the heads are taken from the straw in the field; the heads alone have to be thrashed; the straw remaining in the field as a fertilizer. The first crop is cut for hay, and the second crop is generally allotted for seed. It has a better season of the year to perfect itself, and the farmer more time to attend to it.—*Cotton Planter.*

Why so few Succeed.

Life is a continued battle, in which defeat is suffered more often than victory is won. Along its flinty path the foot-prints of disaster are everywhere seen, and by the wayside are thickly strewed the graves of the fallen. Why is it that so few succeed? Why is the hope with which youth set out so often desolated, and the goal of ambition so rarely reached? The strife is too often commenced without preparation for the struggle. The young, impulsive and ardent think they have but to reach forth their hand to pluck the fruit, that, like the apples of the Hesperides, is only to be gained after the highest endurance and the most patient perseverance. Seldom does genius give the tongue of flame that secures distinction almost without effort. Toilsome study, and persistent investigation, and patient experiment are the only modes of realizing a power to create, or even to recombine, so as to subdue new elements to human use. Physical as well as mental training is necessary for the accomplishment of life-victories. But when the intellect is well cultivated, the bodily energies are often uncultivated. The mind, like friction upon a machine not lubricated, wears out the mechanism of the body, and its growing weakness and disorder nullify the power it envelops. How often a blanched cheek, emaciated limbs, and feeble muscles mark the successful student, who drops into the grave when he is about to reach the goal of his aspirations! We of America have much to learn on this point. A system of intellectual-forcing culture, a habit of putting boys to the business of men, has produced a species of precocity which, however much it may awaken astonishment at the wonderful developments, will leave—nay, has left—manifold evils. At the rate we are now progressing, the time is not far distant when such a thing as boys will be entirely unknown. Now the lads of ten wear the manners of maturity, and the girls of a lesser age are often women in all but physical development. To the want of physical culture there is also to be added a neglect of moral lessons. What school in America teaches "the humanities" as they should be taught? Where is principle laid down as the basis of all good effort? Honourable action, not in the received sense, which is promptitude in resenting any conceived insult or suspected affront, but honourable action, meaning that squared upon the golden rule, "do unto others as you would they should do unto you," inculcated as the highest guaranty of noble results? Our teaching is wrong; our example is wrong; our praise and our censure are often wrong; and the result is that we see fewer of those men, self-made, and strong in rectitude as the eternal truth, firm in principle as the living rock, pure in character as the mountain stream, and vigorous in mind and body as the sturdy oak, who shed honour on our early history.

Hunt's Merchant's Magazine.

Wonderful Power of Fuel.

It is well known to modern engineers, (remarks an English journal,) that there is virtue in a bushel of coal, properly consumed, to raise seventy millions of pounds weight a foot high. This is actually the average effect of an engine working in Huel Towan, Cornwall, England. Let us pause a moment and consider what this is equivalent to in matters of practice. The ascent of Mount Blanc from the valley of Chamouni is considered, and with justice, as the most toilsome feat that a strong man can execute in two days. The combustion of two pounds of coal would place him on the summit.—The Menai bridge, one of the most stupendous works of art that has been raised by man in the modern ages, consists of a mass of iron not less than four millions of pounds in weight, suspended at a medium height of about 120 feet above the level of the sea.—The consumption of seven bushels of coal would suffice to raise it to the place where it hangs. The great pyramid of Egypt is composed of granite. It is seven hundred feet, in the side of its base, and five hundred in perpendicular height, and stands on eleven acres of land. Its weight is there-

fore 12,700 millions of pounds, at a medium height of 125 feet; consequently, it would be raised by the effort of about 630 chaldrons of coal, a quantity consumed in some foundries in a week. The annual consumption of coal in London is estimated at 1,500,000 chaldrons. The effort of this quantity would suffice to raise a cubical block of marble, 2,200 feet in the side, through a space equal to its own height, or to pile one mountain on another. The Monte Nuovo, near Pozzueli, which was erupted in a single night by volcanic fire, might have been raised by such an effort from a depth of 40,000 feet, or about eight miles. It will be observed that, in the above statement, the inherent power of fuel is, of necessity, greatly under-rated. It is not pretended by engineers that the economy of fuel is yet pushed to its utmost limit, or that the whole effective power is obtained in any application of fire yet devised: so that were we to say 100 millions, instead of 70, we should probably be nearer the truth.—*Maine Farmer.*

Advantages of Trees.

We do not know the author of the following beautiful and comprehensive notice of trees, but we think its perusal will cause many of our readers involuntarily and heartily to respond to the familiar and popular language of the song "Woodman spare that tree":—

How beautiful, most beautiful of earth's ornaments, are trees! Waving out on the hills and down in the valleys, in wild wood or orchard, or singly by the wayside, God's spirit and benizon seem to us ever present in trees. For their shade and shelter to man and brute; for the music the winds make among their leaves, and the birds in their branches; for the fruits and flowers they bear to delight the palate and the eye, and the fragrance that goes out and upward from them forever, we are worshipful of trees.

"Under his own vine and fig tree"—what more expressive of rest, independence and lordship in the earth! Well may the Arab reverence in the date-palm a God-given source of sustenance. Dear to the Spaniard is the olive, and to the Hindoo his banyan, wherin dwell the families of man, and the birds of heaven build their nests. Without trees what a desert place would be our earth—naked, parched, and hateful to the eye! Yet how many are thoughtless of the use and beauty of trees. How many strike the axe idly or wantonly at their roots. Above all other things in the landscape we would deal gently with trees. Most beautiful where and as God plants them, but beautiful even as planted by the poorest art of man, trees should be protected and preserved.

If he is a benefactor who causes two blades of grass to grow where one grew before, how much greater his beneficence who plants a tree in some waste place, to shelter and shade, to draw thither song birds, and to bear fruit for man. Plant trees, O man, that hast waste land, and be careful of those that are planted.—*Scientific American.*

The Gooseberry.

Elliott says: "The cuttings of the gooseberry should be made of the new wood of the present year—say in August or early in September, or as soon as the season's growth is completed and the wood ripened. The cutting should be about ten inches long, with all the buds on the lower six inches cut out, and the lower end cut square and even immediately underneath the bud. [It is better that each cutting should have left attached to it a portion of the old wood from which it is cut.] Set the cuttings six inches deep, fill up two inches, and tread very firm and compact; the remaining four inches fill in loosely.

Abused Eyes.

Has your horse eyes, Mr. Lovelight? Good ones? How long do you expect to keep them good, shut up in a dark stable? He who made the animal's eye, made light for that eye, and so constituted it as to meet the wants of the eye. Give your horse the benefit of this exact fitness, Mr. Lovelight. The eye for light, and light for the eye. Aside from freedom, do not deprive your dōmestic animals of the natural blessings to which they are entitled. Give them abundance of light, as well as air and wholesome food. It will be money in your pocket, and show you a merciful man.

Do not ask, "Does God take care of oxen?" but care yourself, as His steward, of the oxen and horses which, from any cause, are under your management, and you will not fail of His blessing. It is not necessary to keep your horses, sheep and cattle in dark stalls and pens, because dark-

ness prevails in your neighbour's barns. Give them a healthful example of light. Recognize the fact that your animals have eyes, and treat them in accordance with it.

Life Illustrated.

Drainage.

The subject of drainage is, very properly, attracting the attention of land-holders in this part of the country. There has been much discussion with regard to the depth at which drains should be laid, and the distances they should be from each other. As an exposition of the principles involved in these points, and as a general illustration of the philosophy of drainage, the following extract from an editorial article in the (London) *Farmers' Magazine*, is worthy of special attention:

We are sometimes told that farmers ought to leave their habits and prejudices at home, and come to the discussion of an agricultural subject, exactly as a lobster would if divested of its shell. Let us see how much a meeting conducted on such terms would be worth. The cultivation of a dark, strong, homogeneous clay, affected entirely by water on its way from the heavens downwards to the sea, and where the principle has been to remove this as quickly as could be effected by open parallel furrows on the surface, a few feet distance only apart, and intersected by parallel open drains, in a cross direction, some 20 or 30 yards asunder. Such a system with one man is the only drainage that he requires to effect his object.

The cultivator from another district, (probably the oolitic), where the soil is a dark, tenacious clay at top, and an open, porous, or absorbent soil below, is satisfied with any depth of drain, provided it is deep enough to penetrate the retentive soil lying above, so as to give the water free admission to the porous sub-soil below. Another, who lives in a district of greatly undulating surface—with a porous sub-soil on extensive or dislocated portions, and intersected at all angles with beds of tenacious clay lying at all depths and thickness—the porous portion supplied and overcharged with water, endeavoring by its own gravity, to force its way through it from the highest to the lowest level, and constantly endeavoring to escape upwards from its disposition to find a level, or rising to the surface by capillary attraction whenever the disintegrated particles rest on quicksands below, already highly charged with water—the resident in such a district says nothing but *deep*-draining will answer, the *distance* apart being only secondary; but nothing less than four-feet drains, and in many instances even twice that depth, will suffice to rid the sub-soil of its injurious occupant.

Again, we have the farmer from a country where one uniform flat surface prevails, and regularity of sub-soil, are each of themselves equally remarkable features; and he requires drains as near to each other, in point of distance, as can be effected—6 yards apart at most and from 26 to 36 inches in depth, running parallel to each other throughout the whole field. This mode he has found to answer his purpose; and he has no doubt will equally answer for every one else.

And thus might we multiply instances without end. But as a few invariable and unerring principles are connected with the subject, we will endeavor to record them.

1st. The specific gravity of water is 817 times heavier than air.

2d. By its gravity it always has a disposition to descend; but the instant it meets with resistance, it exerts its force equally in every other direction.

3d. That force is invariably exerted until it has found a level, and it can then only be said to be at rest.

4th. That whenever this equilibrium is attained, it remains in that state (stagnant) until disturbed.

5th. That in perforating the soil with a drain, that portion nearest the drain is first set in motion, and this is followed in successive rotation by the next nearest portion, and so on to the extent of its action.

6th. That its action ceases whenever the compactness of the soil is sufficient to overcome the gravity of the water held by it in suspension.

7th. That water not only descends by its specific gravity, but ascends by capillary action; wherever the lower portion of the soil rests in water, the complete disintegration of its particles facilitate that object.

8th. That water passing from a higher to a lower level through the soil, always has a tendency to rise to the surface, and would invariably do so unless intercepted by open or underground drains—hence the origin of springs.

9th. Water, on reaching the surface of the earth, would continue to descend in the soil until resisted, which it invariably would

be whenever a porous soil was preceded by a retentive one.

10th. That water in its purest state, as rain water, is slightly charged with ammonia; but to an inconsiderable extent, excepting after long seasons of drought.

11th. That water becoming stagnant in a soil, becomes deleterious to plants growing upon the surface, the mineral deposits, especially iron, after entering into its composition, rising towards the surface.

12th. That water passing through a hollow pipe meets with resistance produced by friction. A pipe filled at one end cannot be made to run full at the other.

13th. That water in a drain, upon meeting with resistance, will fill it continuously upwards until the weight of the column of water overcomes such resistance by the pipes giving way at the lowest point.

14th. That the velocity with which the drains discharge themselves depends upon their inclination and the permeability of the soil.

15th. The specific gravity of water being greater than that of air, it invariably displaces the latter in the soil; but upon its removal, air again occupies the space originally held by it, and thus a continuous action is produced in the soil.

16th. Water when frozen expands, and thus by its power, the hardest substance becomes broken up, or have their external surfaces abraded by its action.

The foregoing is merely a statement of those principles which will ever be coming into operation during the process of draining; and by observing which the operator can seldom err. Of all scientific practices, that of draining is of itself the simplest of application; the merely perforating the subsoil with a hollow drain, at a sufficient depth must necessarily draw off the accumulation of water held in suspension in the adjacent soil. If this be tenacious, from thirty to thirty-six inches will in most cases be sufficient, keeping in mind that, although a greater depth might be desirable, the cost of the drainage ought always to govern the proceeding. On the contrary, if the subsoil is porous and charged with water flowing from a higher level, then the drains must be sufficiently deep to carry off the water, that the soil near the surface may not be rendered wet by capillary action, bearing in mind that the more complete and minute the disintegration of the soil, the greater the disposition of the water from below to ascend towards the surface. In some cases drains from 40 to 50 inches will be requisite.

In soils alternating in quick succession of beds of gravel, sand, and clay, a few deep drains judiciously placed will generally effect the drainage of large portions of a field, remembering that the drain should always be cut so as to intercept the water passing in the gravel or sand before it reaches the clay, and in a parallel direction with the edge of the deposit. In some cases the merely perforating the clay in one continuous line from one gravel bed to another to the lowest level, will also equally well effect the object. The drains must invariably be deep enough to release the gravel altogether, and a previous knowledge of their extent and situation ought to be ascertained.—*Boston Cultivator.*

The Annual Yield of Nitrogen Per Acre in Different Crops.

BY J. B. LAWES, F.R.S., F.C.S., AND J. H. GILBERT, PH.D., F.C.S.

[*Read at the British Association for the advancement of Science, Leeds. Section B., September* 28*th*, 1858.]

ABSTRACT.

In a paper given last year at the Dublin meeting, on the question of the Assimilation of Free Nitrogen by Plants, and some allied points, the authors had stated in general terms, that the amount of nitrogen yielded per acre, per annum, in different crops—even when unmanured—was considerably beyond that annually coming down, in the forms of ammonia and nitric acid, in the yet measured and analyzed aqueous deposits from the atmosphere. The investigations then referred to were still in progress; and a desirable introduction to the record of the results would obviously be to illustrate by reference to direct experiment that which had been before only assumed regarding the yield of nitrogen in our different crops. To this end, had been determined the annual produce of nitrogen per acre, in the case of various crops, which were respectively grown for many years consecutively on the same land, namely, wheat fourteen years, barley six years, meadow hay three years, clover three years out of four, beans eleven years, and turnips eight years. In the majority of the instances referred to, the yield of

nitrogen had been estimated, both for the crop grown without manure of any kind, and for that with purely mineral manure—that is, excluding any artificial supply of nitrogen. It was the object of the present communication to give a summary view of some of the facts thus brought to light.

Beans and clover were shown to yield several times as much nitrogen per acre as wheat or barley. Yet the growth of the leguminous crops, *carrying off* so much nitrogen as they did, was still one of the best preparations for the growth of wheat; whilst *fallow* (an important effect of which was the accumulation within the soil of the available nitrogen of two years into one,) and *adding nitrogenous manures*, had, each, much the same effect in increasing the produce of the cereal crops.

Other experimental results were adduced, which illustrated the fact that four years of wheat, alternated with *fallow*, had given as much nitrogen in the eight years as eight crops of wheat grown consecutively. Again, four crops of wheat, grown in alternation with *beans*, had given nearly the same amount of nitrogen per acre as the four crops grown in alternation with fallow; consequently, also much about the same as the eight crops of wheat grown consecutively. In the case of the alternation with *beans* therefore, the whole of the nitrogen obtained in the beans themselves was over and above that which was obtained during the same series of years in wheat alone—whether it was grown consecutively or in alternation with fallow.

Interesting questions arose, therefore, as to the varying sources, or powers of accumulation, of nitrogen in the case of crops so characteristically differing from one another as those above referred to.

It had been found, that the leguminous crops which yielded in their produce such a comparatively large amount of nitrogen, over a given area of land, were not specially benefited by the direct application of the more purely nitrogenous manures. The cereal crops, on the other hand, whose acreage yield of nitrogen under equal circumstances was comparatively so small, were very much increased by the use of direct nitrogenous manures. But it was found that, over a series of years, only about 4-10ths of the nitrogen annually supplied in manure for wheat or barley (in the form of ammonia-salt or nitrates) were recovered in the immediate increase of crop. Was any considerable proportion of the unrecovered amount drained away and lost? Was the supplied nitrogenous compound transformed in the soil, and nitrogen in some form evaporated? Did a portion remain in some fixed and unavailable state of combination in the soil? Was ammonia, or free nitrogen, given off during the growth of the plant? Or, how far was there an unfavourable distribution, and state of combination, within the soil, of the nitrogenous matters applied directly for the cereal crops—those, such as the leguminous crops, which assimilated so much more, gathering with greater facility, and from a different area of soil, and leaving a sufficient available nitrogenous residue within the range of collection of a succeeding cereal crop? These questions, among others which their solution more or less involved, required further elucidation before some of the most prominent of agricultural facts could be satisfactorily explained.

Comparing the amount of nitrogen yielded in the different crops, when grown without nitrogenous manures as above referred to, with the amount falling in the measured aqueous deposits, as ammonia and nitric-acid, it appeared, taking the average result of the analysis of three years' rain, that all the crops yielded considerably more, and some very much more, than so came down to the soil. The same was the case when several of the crops had been grown in an ordinary rotation with one another, but without manure, through two or three successive courses. Was this observed excess in the yield over the yet measured source at all materially due merely to exhaustion of previously accumulated nitrogenous compounds within the soil? Was it probably attributable chiefly to the absorption of ammonia or nitric-acid from the air, by the plant itself or by the soil? Was there any notable *formation* of ammonia or nitric-acid, from the free nitrogen of the atmosphere? or, did plants generally, or some in particular, assimilate this free nitrogen?

As already intimated, some of the points which had been alluded to, were at the present time under investigation; the authors having, in this, the able assistance of Dr. Pugh. Others, it might be hoped, would receive elucidation in the course of time. There of course still remained the wider question of the original source, and

of the distribution and circulation, of *combined nitrogen*, in the soil, in animal and vegetable life on the earth's surface, and in the atmosphere above it.—*The British Farmers' Magazine.*

Night Air.

During the months of September and October, throughout the United States, wherever there are chills, and fever and ague, intermittents, or the more deadly forms of fever, it is a pernicious, and even dangerous practice, to sleep with the outer doors and windows open; because miasm, marsh emanations, the product of decaying vegetation—all of which are different terms, expressing the same thing—is made so light by heat, that it ascends at once towards the upper portion of atmospheric space, and is not breathed during the heat of the day, but the cool nights of the Fall of the year condense it, make it heavy, and it settles on the ground, is breathed into the lungs, incorporated into the blood, and if in its concentrated form, as in certain localities near Rome, it causes sickness and death within a few hours. The plagues which devastated Eastern countries in earlier ages, were caused by the concentrated emanations from marshy localities, or districts of decaying vegetation; and the common observation of the higher class of people was, that those who occupied the upper stories, not even coming down stairs for market supplies, but drew them up by ropes attached to baskets, had entire immunity from disease, for two reasons, the higher the abode, the less compact is the deadly atmosphere, besides, the higher rooms in a house, in summer, are the warmer ones, and the miasm less concentrated. The lower rooms are colder, making the air more dense. So, by keeping all outer doors and windows closed, especially the lower ones, the building is less cool and comfortable, but it excludes the infectious air, while its warmth sends what enters through the crevices immediately to the ceilings of the rooms where it congregates, and is not breathed; hence is it that men who entered the bar-room and dining saloons of the National Hotel, remaining but a few brief hours, were attacked with the National Hotel disease, while ladies who occupied upper rooms, where constant fires were burning, escaped attack, although remaining in the house for weeks at a time. It was for the same reason that Dr. Rush was accustomed to advise families in the summer time, not being able to leave the city, to cause their younger children especially, to spend their time above stairs. We have spent a life-time ourselves in the West and extreme South, and know in our own person, and as to those who had firmness to follow our recommendation, that whole families will escape all the forms of Fall fevers who will have bright fires kindled at sunrise and sunset in the family room. But it is too plain a prescription to secure observance in more than one family in one thousand. After the third frost, and until the Fall of the next year, it is an important means of health for persons to sleep with an outer door or window partly open, having the bed in such a position as to be protected from a draught of air. We advise that no person should go to work or take exercise in the morning on an empty stomach; but if it is stimulated to action by a cup of coffee, or a crust of bread, or apple, or orange, exercise can be taken, not only with impunity, but to high advantage in all chill and fever localities.—*Hall's Journal of Health.*

From the Ohio Cultivator.

Transplanting Forest Evergreens.

Friend Harris:—The taste and character of a people is manifest in the appearance of their homes. And in turn, the character of the homes of a country have a powerful influence on the character and taste of the inhabitants. Who ever knew a well appointed home, beautified with the rich adornments which nature so bountifully affords, to turn out an awkward, uncouth youth?

Fearing that an article in the last number of the *Cultivator* may discourage some from transplanting evergreens from the forest, I submit a little practical experience. I have about my premises a number of White Pine and Cedar, and some Hemlock, brought from dense forests on the margin of a stream, out of the sandy, gravelly soil they delight in, and set in strong limestone loam, with tenacious clay subsoil, living and flourishing. Bro. James has them also growing in his yard, and while a boy at my father's, I set out Cedar and Hemlock that have attained considerable size, and are beautiful, dense trees. The rationale and modus operandi are very simple.

The great difficulty in successfully transplanting Evergreens, is the extreme tenderness of the wood. If the earth is removed from the roots, it is almost sure to break off with it the small fibres or spongioles through which the tree receives its nutriment. The great desideratum, then, is to keep the earth about the roots as near in place as possible. Dig the holes to receive the trees, say four to six feet in diameter, and two to three feet deep.. Fill them up within eighteen inches of the top, mingling with the earth a considerable portion of gravel or stones, twigs, leaves, etc. Then take the wagon and one or two good hands, and if you have to go five or ten miles for the trees, start early, so that you need not be hurried. When you get to the woods, remember that if you carelessly take up a dozen trees and they die, you not only lose your time and labor, but are responsible for discouraging yourselves and neighbors; while, if you transplant half the number with care and skill, and they live, your labor could scarcely be expended more profitably, as you not only increase the enjoyment of your own families, and every one who visits you, but add hundreds of dollars to the price of your property, in case of its sale.

Dig a trench around the tree far enough from it to not mangle the roots, and when satisfied you are below the level of the roots, undermine it till it is loose. Then slip a board under, and work the tree gradually on to it, till one can get hold of each end, and so carry it and place it nicely in the wagon. After arranging the trees all in the wagon, throw in a considerable amount of dirt taken from where the trees grew; this will help to keep the earth attached to the roots in place, and be excellent to put about the trees in setting them out. As you put the dirt about the roots, keep throwing in water to settle it closely around them. Plant the tree about the same depth it grew in the woods, but leave the hole in which it is set, unfilled, say four to six inches below the surface of the ground, in order that it may collect moisture and hold the mulching. Mulch it with pine twigs and leaves brought from the woods. In this way I transplant Evergreens from the forest, from one to four inches in diameter, and though some die, enough live to compensate tenfold for the trouble.

WM. H. LADD.

Never speak evil of your neighbour.

From Hunt's Merchants' Magazine.

Human Hair as an Article of Trade.

Few persons are probably aware of the extent to which the traffic in human hair is carried. It has been ascertained that the London hair-merchants alone import annually no less a quantity than five tons. But the market would be very inadequately supplied if dependence were solely placed on chance clippings. There must be a regular harvest, which can be looked forward to at a particular time; and as there are different markets for black tea and green tea, for pale brandy and brown brandy, so is there a light-haired market distinct from the dark-haired.

The light hair is exclusively a German product. It is collected by the agents of a Dutch company who visit England yearly for orders. Until about fifty years ago, light hair was esteemed above all others. One peculiar golden tint was so supremely prized, that dealers only produced it to favourite customers, to whom it was sold at eight shillings an ounce, or nearly double the price of silver. The rich and silk-like texture of this treasured article had its attractions for poets and artists as well as traders. "Shakespeare especially," says one of our authorities, "seems to have delighted in golden hair." "Her sunny locks hung on her temples like the golden fleece;" so Bassanio describes Portia in the *Merchant of Venice.* Again, in the *Two Gentlemen of Verona,* Julia says of Sylvia and herself: "Her hair is auburn, mine is perfect yellow." . . . . . . Black hair he only mentions twice throughout his entire plays, clearly showing that he imagined light hair to be the peculiar attribute of soft and delicate women.

A similar partiality for this colour, touched with the sun, runs, however, through the great majority of the poets, old Homer himself for one; and the best painters have seized, with the same instinct, upon golden tresses. A walk through any gallery of old masters will instantly settle this point. There is not a single female head in the National Gallery, beginning with those glorious studies of heads, the highest ideal of female beauty by such an idealist as Correggio, and ending with the full-blown blondes of the prodigal Rubens—there is not a single black-haired female head amongst them.

But all this has passed away; the dark brown hair of France now rules the market. It is the opinion of those who have the best right to offer one on such a subject, that the colour of the hair of the English people has deepened in tint within the last fifty years, and that this change is owing to the more frequent intermarriages, since the Napoleonic wars, with nations nearer to the sunny South. Whether dark or light, however, the hair purchased by the dealer is so closely scrutinized, that he can discriminate between German and the French article by the smell alone; nay, he even claims the power, "when his nose is in," of distinguishing accurately between the English, the Welsh, the Irish, and the Scotch commodities. The French dealers are said to be able to detect the difference between the hair "raised" in two districts of Central France, not many miles apart, by tokens so slight as would baffle the most learned of our naturalists and physiologists.

Black hair is imported chiefly from Brittany and the South of France, where it is annually collected by the agents of a few wholesale Parisian houses. The average crops—we scorn the imputation of a pun—harvested by these firms, amount yearly to upwards of two hundred thousand pounds weight. The price paid for each head of hair ranges from one to five francs, according to its weight and beauty; the former seldom rising above a pound, and seldom falling below twelve ounces. The itinerant dealers are always provided with an extensive assortment of ribbons, silks, laces, haberdashery, and cheap jewelry of various kinds, with which they make their purchases as frequently as with money. They attend all the fairs and merrymakings within their circuit, and the singularity and novelty of their operations are wont to strike travellers more than anything else which meets their notice. "In various parts of the motley crowd," says one who had stopped to stare his fill at one of the Breton fairs, "there were three or four different purchasers of this commodity, who travel the country for the purpose of attending the fairs, and buying the tresses of the peasant girls," who seem, indeed, to bring the article to market as regularly as peas or cabbages. "They have particularly fine hair," he continues, "and frequently in the greatest abundance. I should have thought that female vanity would have effectually prevented such a traffic as this being carried to any extent. But there seemed to be no dfficulty in finding possessors of beautiful heads of hair perfectly willing to sell. We saw several girls sheared, one after the other, like sheep, and as many more standing ready for the shears, with their caps in their hands, and their long hair combed out and hanging down to their waists. Some of the operators were men, some women. By the side of the dealers was placed a large basket, into which every successive crop of hair, tied up into a wisp by itself, was thrown." As far as personal beauty is concerned, the girls do not lose much by losing their hair; for it is the fashion in Brittany to wear a close cap, which entirely prevents any part of the *chevelure* from being seen, and of course as totally conceals the want of it. The hair thus obtained is transmitted to the wholesale houses, by whom it is dressed, sorted, and sold to the hair-workers in the chief towns, at about ten francs per pound. The portion of the crop most suitable for perukes is purchased by a particular class of persons, by whom it is cleaned, curled, prepared to a certain stage, and sold to the perukeiers at a greatly advanced price—it may be forty, or it may be eighty francs per pound. Choice heads of hair, like choice old pictures, or choice old china, have, however, no limit to the price they may occasionally command.

From Hunt's Merchants' Magazine.

Vegetable and Truck Trade of Norfolk, Virginia.

The accurate and accomplished clerk of the Merchants and Mechanics' Exchange has extracted from the shipping lists of the various steamers, and other authentic sources, the number of barrels, boxes, and baskets of peas, cucumbers, beans, tomatoes, radishes, rhubarb, asparagus, apples, pears, peaches, &c., &c., and below we give the total exports to each market during the months of June, July and August:—

	Packages.	Value.
New York	52,301	$183.053 50
Philadelphia	7,305	25,567 50
Baltimore	67,424	235,984 00
Richmond	1,565	5,477 50
Total,	128,595	$450,082 50

The above packages are estimated at

3 50, which is a low figure, as the largest ortion of the packages were barrels of ıcumbers, radishes, potatoes, &c., which, ı the early part of the season, commanded 6 to $10 each.

The above statement shows a very large mount shipped to Baltimore, and it is roper to remark that much of it went ırough to Philadelphia, Washington, and ven as far as Cincinnati, via the former ity. In addition to the above, there have een from 75,000 to 100,000 water-melons ııpped hence to Northern ports during the eason. It will be seen, by comparing the regoing statement with that made last ear, that this trade is very rapidly increasıg. The total quantity shipped last year, as 96,099 packages, valued at $336,-46 50; we have, therefore, an increase ıis year in quantity of 32,496 packages, ıd in value of $113,736.

ferchandise exported from the Port of Norfolk during the month of September, 1858, *as reported on the Books of the Merchants and Mechanics' Exchange.*

COASTWISE.

	Quantity.	Value.
.pples, dried,....bush.	1,892	$3,845
.pple brandy....bbls.	39	1,287
'orn.............bush.	43,164	33,867
'otton...........bales	288	14,400
'ish.............bbls.	109	436
'laxseed.........bush.	896	1,593
'lour............bbls.	75	475
'eaches, dried....bush.	192	1,356
'eas.............bush.	76	112
Rosin............bbls.	148	508
'ar..............bbls.	613	1,379
taves............No.	40,000	1,800
hingles..........No.	903,750	4,391
pirits turpentine..bbs.	24	74
Vheat...........bush.	17,519	20,131
Total		$85,454

FOREIGN.

Beef..............bbls.	24	$312
Railroad cross-ties..No.	2,934	1,173
Staves............No.	620,837	19,008
Splice blocks.......No.	1,000	500
Total		$20,993
Grand total		106,447

Reflections on Vegetable Physiology.

BY YARDLY TAYLOR, OF VA.

The perfection of ancient philosophy was ıeld to consist in the abstraction of the mind from material objects, and thus, by eaving it free from earthly influences, was supposed to be the only way to obtain true wisdom. This, by leading men to consider the things of this world as beneath their notice and investigation, was well calculated to retard the advancement of true science and of even their earthly interests. Man is a social being, connected with the things of time and sense in such a way, that his true interests lie in giving to each the attention they deserve. In the revival of learning, after what was called "the dark ages," it was too often the practice of philosophers, to advance theories for the operations of nature, partly founded on investigation, and partly on conjecture. Indeed it could hardly be otherwise; for the laws that govern the operations of nature in many instances, are yet but imperfectly understood. Theories once considered correct are now found to be erroneous, and every true advance in science, tends to explain something hitherto conjectural.

It is not living in an enlightened age, that make sus enlightened, but by living up to enlightened principles.

It is much easier to take things on hearsay, than to acquire knowledge by investigation; hence, there are often, in this day, theories put forth by writers on scientific subjects not in accordance with facts.—When it was ascertained, that matter for vegetable growth, was imbibed by the roots and carried up by the ascending sap, as well as imbibed by the leaves, and the importance of sun light to vegetation became known, the theory of the circulation of the blood in the animal economy, was considered as a type of the circulation of the sap in vegetables. Hence it was thought, that an upward flow of sap through the sap wood, was designed to carry the matter for growth to the leaves, where it was spread out to the action of sun light, and thus prepared for assimilation by the plant, then carried by a downward flow of sap between the bark and wood, and deposited for growth. But now, botanical writers reject the theory of any downward flow of sap at all, and maintain that, considering the great amount of water thrown off by evaporation from the leaves, there is ample ground for believing, that materials enough for growth may be imbibed by the sap and by the leaves in the form of carbonic acid gas, and that the decomposition of the latter gas, will furnish the carbon of the plant. And, were they to admit the principle of electricity, as the prin-

cipal agent in decomposing this gas, they would most probably have a theory much nearer to the real facts of the case than any other yet offered to the consideration of the enquiring mind. (See, *New American Encyclopedia*, article, *Botany*.)

Many curious phenomena may be observed by the investigator in vegetable growth, and some of these have been designated as "vegetable instinct." A late writer in a periodical enumerates some of these peculiarities, such as the habit of a plant growing in the direction of water; that of convolvulus, or scarlet runner, reaching towards an upright support to sustain itself, and its coiling round only one way; and then goes on to say, "yet, notwithstanding, if two of those plants grow near each other, and have no stake around which they can entwine, one of them will alter the direction of its spiral, and they will twine round each other." Now this is entirely a mistake, and can only have been made without examining into the nature of the case. What need is there of its altering its spiral to attain its purpose? None in the world, and it would only encounter more difficulty. Nothing is easier than for two twining plants, to twine round each other; it is often seen in gardens; but then they always twine the same way, never otherwise, unless force is used. Let a person attempt to twist two strings together in opposite directions, and he will find himself foiled in the attempt and see the awkwardness of the undertaking. Nature never works awkwardly.

Different plants have different habits in this respect, but then the habit of each class of plants is the same without variation. Different varieties of convolvulus, lima and other beans, twine round from East by North and West and South, in ascending, while the hop vine and honeysuckle twine round the other way; that is from East by South to West and North. The tendrils of vines, such as grape vines, the ground tribe, &c., exhibit some curious phenomena. They are often several inches in length, and if, in reaching forth, they come in contact with any support near their extremity, they soon clasp it, by twining round it in the direction of the habit of the plant, and thus fix themselves. The remainder of each tendril between the vine and support then assumes a spiral form like a corkscrew, and in doing so, as both ends are secure, the spiral, from about the middle, is turned each way, just as if we fastened a string forming a loop with both ends tied to a stick, and then, by taking the middle of each loop and wrapping the string round the stick, each end would be wrapped in a different direction; that end nearest the vine being strongest, retains the direction of the habit of the plant, while the weaker part has to give up its natural direction, but will assume the spiral form, however, as completely as the other, but only by force.

The habit of the roots of trees, vines, &c., increasing faster in the direction of water, has been supposed to belong to that undefinable law "vegetable instinct," a law that may be called in whenever we can assign no known law for an effect produced. But is there no known law, to account for this effect?

Scientific botanists, now, all acknowledge increase of growth to be by the addition of of cellular matter, furnished the plant in sap, and containing the materials for growth. This cellular matter will be more abundant where water could dissolve more of it from the soil; hence the roots will increase faster where water and its other proper nutriment are most plenty, and increase in that direction. But there is another law of matter that here comes in and plays a most beautiful part in this connection—the law of capillary attraction. The earth being a porous substance, the water ascends by capillary attraction, whenever the surface above becomes dry. Hence the earth in the vicinity of water beneath it, is more moist in a dry time than that in other places. Thus the roots extend more rapidly, because there is more materials for growth in that direction than in others. This is just what we might expect; a natural result from well known causes. Roots of trees have penetrated six or seven feet deep into the ground, and stopped up an underdrain for the conveyance of water. They have been known to descend 30 or 40 feet deep into wells to the surface of the water there. I have seen the roots of a willow tree, where it penetrated a pipe made of hydraulic cement through an opening not larger than a fine knitting needle, and after reaching the inside, there enlarging and branching until it nearly choked up the pipe and stopped the water. The power of capillary attraction, exerted by water in entering the roots of trees and plants is enormous. It is a powerful means of breaking up the rocky matters near the earth's surface, and thus forming soil.

The habit of the sunflower opening its broad disk of petals towards the morning sun, is another fact attributed to "vegetable instinct." Here again we see laws of matter, that are calculated to produce this effect. The young stalk with its head containing the embryo flower, is at first, like all young thirfty growing plants full of sap, with its carbon or woody fibre very tender. In the morning, when the dews of the night have prevented much evaporation from the leaves of the plant, its tissues are distended with sap and thus braced upward on every side; but after the rising of the sun, its rays strike the plant on the eastern side, and causes the evaporation of the dew from that side first, by warming the bark of the plant on that side and evaporating the juices there, before the dew is driven off from the opposite side. The difference in temperature between the sunny and the shaded sides of the plant is, early in the morning, considerable, while, in the after part of the day it is much less. Hence the tissues of the plant being relieved from distention on one side, even for a few hours, give a leaning direction that way, and, as this is repeated every day, and the increasing weight of the plant is added, a permanent position is given to the plant as it hardens in growth. The flexibility of young growing plants, is very conspicuous in the growth of the young fruit of the crooked-neck squash. The young fruit when the flower drops off, is slender and two or three inches long, and as the stem end is fixed somewhat permanent, the elongation of the fruit must be by pushing the blossom end forward; and when the space for this has no obstruction, the fruit grows straight, but if any obstruction interfers with it, and stops this movement, the young fruit bends sideways as it must grow, and often turns the blossom end of the fruit completely round towards the stem of the plan, thus forming a semi-circle.

The laws of vegetable physiology in the growth of plants, are well calculated to interest the enquiring mind. Their simplicity and adaptedness to the end proposed, give indubitable evidence of wisdom and design. It is seen that, by these operations, the otherwise inert matters of the earth and air, are converted into plants and fruits, and thus these matters are prepared to sustain animal life, which they could not do without this conversion. And then again, animals in giving off carbonic acid gas by breathing, furnish that gas to growing plants. This completes a circle of results, apparently of boundless extent, for the more vegetable growth is produced to sustain animal life, the greater quantity of carbonic acid gas is given off in supporting vegetable growth. It is hard to say, where the limit of this increase in both kingdoms is to be seen; we know but little of what the earth may be made to produce, or the amount of animal life that may be supported from a given space. It should be the part of Scientific agriculture, to investigate the conditions necessary to produce heavy crops, not by theories of science merely, but by careful study of soils and manures and the conditions under which heavy crops have been grown. The difference in soils, and the different application of manures to suit those differences, give ample scope for the exercise of the ablest talent.

It has been too much the practice of mankind to look up to deeds of daring and boldness, as the ennobling acts of individuals, when, if we could see the workings of their minds in moments of reflection and composure, we might come to a very different conclusion. It has been said with a good deal of truth, and a truth that will be more and more acknowledged as agriculture improves, that the statue of Washington in the Capitol at Richmond, that represents him in the costume of a farmer with the sword laid aside, and the emblems of agriculture around him, presents him in a far more dignified and noble aspect than any statue of him with military appendages. It is to be hoped that this feeling will more and more abound, and thus by the improvement in agriculture and the arts of peace, a restraining influence on war will be exerted, and cause man to be the friend of man.

American Farmer.

From the Germantown Telegraph.

The Cut Worm.

Dear Major—In conversation a few days ago with an old farmer, he made the following statement in regard to the ravages of the cut worm. He said: "Last year I had a field of corn much injured by their depredations, and tried this experiment. I obtained a number of pieces of common elder, about a foot long, and distributed them over the field two or three yards apart in every third row. On examining the elder branches every morning, I found numbers of worms

collected under them; in some instances as many as fifteen or twenty; when they were easily destroyed. The elder seemed to have the property of attracting them." As this is a simple remedy, and the time is now at hand for planting corn, it is worthy a trial. This may be generally known, but if there be any virtue in it, the repetition will do no harm. Truly yours, J. H. S.

Rain Water—Under-Drains, Etc.

The following article is full of useful truths, but the writer in enumerating the sources from whence the soil receives water, has failed to notice that portion received from dews and from condensation upon the surface of cold particles, from the atmosphere circulating in the soil. The fact that the surface evaporation of water reduces the temperature of soils, and that such loss is prevented by under-draining, is fully proved. The loss of ammonia and nitric acid by drainage water is, however, over-stated, as when the drains are sufficiently deep, the loss of these ingredients is no greater than would occur in undrained lands by the same ingredients sinking below the level of roots, while in the drained lands the reception of nitric acid and ammonia from the atmosphere, is increased much more than equal to the quantity parted with by the water.—*Working Farmer.*

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Whatever be the sources of the influence exerted by the rain upon the soil, it is only as the soil enables it to reach the roots of plants that it can act for good. Let us, therefore, consider the means of its access to the plants growing on the soil.

Water can get into the soil in three ways. 1st, as rain falling directly on its surface; 2d, as in the case of spring-water rising from below, where there is a direct connection between the soil and a reservoir at a higher level; 3d, by that surface attraction of matter for it, which, as exhibited by porous substances on water lying beneath them is called capillary attraction. And it is plain that any attempt to drain a field must be guided by all three of these considerations. The quantity of the rain-fall, added possibly to an additional supply from beneath, and both held with more or less tenacity by capillary attraction within the soil, is the agent which you wish by means of drainage, we will not say to get rid of, but to direct to useful ends in the growth of your plants.

Again—water can leave the soil in three different ways; 1st, by running over its surface; 2d, by evaporation from its surface; 3d, by percolation through its substance.—And let us consider what the water does and does not do when escaping from the land in each of these several ways.

1. In the first, when running over the surface of the land, it is of course inoperative. It is wanted to dissolve food out of the soil and feed the plants upon it. It is wanted to bring its own supplies, such as they are, from the air for the nourishment of these plants. It is wanted to break up and comminute the soil by its passage through it. It is wanted for the sake of its own dissolved oxygen and carbonic acid, as well as for the same ingredients in the atmospheric air which follows it in its passage downwards, both of these substances acting usefully in the laboratory of the soil. And it is wanted especially in the spring time for the sake of the temperature of the spring showers, which, if they could get into the land, would warm it. None of these things can it do. It runs off the surface without penetrating it, and its influence as well as want of influence are shown in the case, which often happens, of rain water falling on a frozen field. If it could gain access to the substance of the soil the whole furrow slice would at once be thawed, and we should have vegetable growth recommencing earlier. If it could make its escape through the soil instead of over it, we should avoid those surface currents which wash the finer particles into the furrows and the ditches. The *fertilizing* influence of a *constant* surface current seen in the water meadows is perfectly consistent with the mischievous influence of the state of things with its occasional surface currents seen in every undrained field. The former co-exists along with an escape of water through the soil, for a constant drainage is as necessary as a constant water supply to successful irrigation.

2. But let us now consider what the water does during its escape by evaporation.—In the first place, it is worth while remembering as being among the comparatively indefinite results of evaporation from the surface of the soil, that in this way great loss ensues of the nutritive substances which the water held in solution. It is very true that some theorists contend for what they call the leaf-feeding of plants, and urge that all the benefits of cultivation during the growth of

plants arise from the extension of this evaporation, by which the leaves of the growing plants thus obtain a more abundant supply of food; but we believe that our object in cultivation should rather be to increase the stores of food within the soil, and that tillage operations have this tendency by increasing the quantity of absorbent surface within the soil which is exposed to the air.

The principal result however of the loss of water by evaporation is indicated by the fact that during the conversion of every pound of it into vapor, as much heat is consumed and lost as would be produced by burning 2 or 3 ounces of coal; and when you think that an ordinary rain-fall amounts to 3,000 tons per acre per annum, you can easily conceive that the loss of heat by the evaporation of a comparatively inconsiderable portion of this must involve a great cooling of the land. If 30 inches of rain were evaporated in this way, it would need 1 cwt. of coal per hour per acre through the year to make good the loss of heat sustained in this way; a quantity which, in Dr. Arnott's hands, would give us an Italian climate.—The quantity however actually lost by evaporation is of course nothing like this; a great deal of water finds its way through the land. The water supply of all our springs and wells, if that were known, would indicate its quantity for the island. A great deal escapes in flood times by running over the surface, and a great deal now finds its way out of drains after percolation through the soil. Notwithstanding these causes, however, and notwithstanding the extremely irregular character of the rain-fall, the loss by evaporation must be very considerable. Dalton measured the quantity of water escaping from two rain gauges, one of an ordinary kind, and the other filled 3 feet deep with earth, and he found that of 33 inches of rain which fell per annum as indicated by the one, only 8½ passed through that quantity of earth as indicated by the other, and he concluded therefore that the difference between the two—25 inches, or three-quarters of the whole annual fall—escaped by evaporation.

Mr. Dickinson, of Abbot's Hill, near Kings Langley, has for several years copied Dalton's experiments, with results somewhat different from his; finding that of 26 inches per annum, 15 were evaporated, while as much as 11, rather more than two-fifths of the annual rain-fall, passed through the soil. His results, however, probably exaggerated the quantity of the rain-fall which in general passes through the land, for it is plain that earth loosely placed in Dalton's gauge is much more likely to transmit the rain which falls upon it than the same depth of earth can be in ordinary circumstances, the lower half at least never having been disturbed since the Deluge. And in fact the attempt of Mr. Milne Home to ascertain the truth upon this point, by measuring the water actually escaping from the mouths of drains in a field of a given extent (though it on the other hand was liable to an opposite error because it could not take account of what went through the land altogether to feed the wells and springs of the neighborhood) leads to the conclusion that a much less quantity of water than either Dickinson or Dalton indicates, passes through the land in the course of the year. And it would appear from this that the loss of water by evaporation even in well-drained soils is considerable, and therefore that the loss of heat by evaporation is to a great extent unavoidable.

3. Let us now, however, consider what water does by percolation; and its effects here we must do little more than enumerate. They are shortly these; it carries the temperature of the air into the soil, a thing the possible injury of which, as in autumn and winter when the air is colder than the soil, is as nothing compared with the benefit of it in spring when the air is warmer than the soil and when the advantages of early growth are great. The most important experiments which we know, proving the influence of drainage on the temperature, are those described by Mr. Stephens in his exceedingly instructive little book descriptive of the Marquis of Tweeddale's operations at Yester Mains, where, the temperature of soil being 48 deg. in its undrained state, the cutting of a drain near it and the setting in of a current through it, raised its temperature 1½ deg. in six hours.

Another effect of water percolating through the land is seen in the introduction to it of the atmospheric elements which it holds in solution. The carbonic acid by its operation on the alkalies and alkaline earths is a powerful solvent and disintegrator, and the oxygen keeps in check the deoxydating effect of vegetable matter in the soil, which in its absence tends to reduce the higher state of oxydation of the iron present in the

soil into the lower state, when it does mischief by forming with acids in the soil soluble salts injurious to vegetation.

But the main purpose served by water during its percolation through the land is that of feeder of the plants. A fertile soil, cultivated so as to exhibit its fertility in the most profitable manner, has growing upon it crops whose habit and specific character are adapted to the climate in which they are placed, and to the character of the soil itself—it yields these crops in the order in which each succeeding to the cultivation of its predecessor shall find the soil, chemically as regards its contents, and mechanically as regards its texture, and practically as regards consequent cleanness of the land and the fitness of their respective times of cultivation to one another, in the best condition for the supply of the wants of the crop in question—it is annually manured and cultivated so as best to meet the current wants of the plants cultivated on it—but it is especially dependent for all its powers to bring these crops to a fruitful maturity upon the fact that there is during every shower and after every shower of rain a continual current of water and current of air throughout its substance, not too rapid lest its soluble parts should be washed to waste; indeed, it is hardly possible to be too slow; slow enough however, to dissolve from the soil whatever it contains of food for plants, and fast enough to be continually bringing fresh supplies by every mouth which the absorbing extremities of the roots of plants present.

All these purposes of *warming* the soil, of *introducing substances* within it which shall operate chemically upon the mineral and other matters within the soil, and of *converting the soil into an efficient vehicle* of the matters which it contains, are answered by the percolation of water through the soil. You must not think then of drainage as being a contrivance for getting rid of water as an enemy from the land; nor must you think of a wet and ill-drained field as being merely an illustration of the injury done by water *in excess*, as it is called. Water need hardly ever be an enemy, and need hardly ever be in excess. Drainage is a contrivance for making use of it as a friend, and an ill-drained field is an illustration of the mischief done by water, whether there be little of it or much, when not in motion.

It is well however to consider the *mischief* that may be done by the percolation of water. If, as it moves through the soil, it contains the food of vegetables in solution when it passes the mouth-piece of a plant, no doubt it also contains useful matters in solution when it passes into the drain which is to convey it altogether away, and the waste of food for plants by our drainage water is a matter of considerable importance. It has been most admirably investigated by Mr. Wray during the past year. His results are given in the following table:

Samples of drainage water from Mr. Paine's very highly manured field contained grains per gallon of		Samples of drainage water from Mr. Acland's poor clay contained grains per gallon of	
Ammonia.	Nitric acid.	Ammonia.	Nitric acid.
.018	7.17	.003	4.78
.018	14.74	trace.	2.99
.018	12.72	.012	.628
.012	1.95	.012	.12
.018	3.45	trace.	.485
.018	8.85		
.006	11.45		
.018	3.91		

He found that the drain of water from highly manured fields near Farnham contained 18-thousandths of a grain of ammonia in every gallon; but as much as 4 to 14 grains of nitric acid: while from ordinary poor arable soil in Devonshire the drain water contained from 3 to 12-thousandths of a grain of ammonia, and from one-tenth to as much as 4 grains of nitric acid in a gallon.

From this it appears that there is a very large waste indeed of nitrogen in the form of nitric acid in the drainage of very highly manured fields; comparatively little, however, in the case of fields of ordinary cultivation. Whatever it is, we must simply bear it as a tax upon the otherwise general advantage of the practice of land drainage. One very satisfactory thing observable in the results of these experiments is the comparatively small quantity of ammonia which the samples of rain water contain, even when compared with that present in the rain water which falls upon the land.—*Agricultural Gazette.*

Divine truth, in its integrity, has a vitality, an inherent principle of life, of which fruit unto life eternal is but the natural result.

The Southern Planter.

RICHMOND, VIRGINIA.

Tobacco.

As many of our subscribers intend to "go in" for a crop of Tobacco this year, for *the first time*, we think it best to give them a word of caution in advance of their efforts, hoping thereby to abridge, or at least to mitigate the trouble to which they are surely destined, after their crop is pitched. Premising that we have had but little experience in making this crop, except so far as the *trouble* is concerned, we give them a few items of the advantages and disadvantages of its cultivation which have appeared most prominent to us. We have commenced growing tobacco because—1st. We think it best to have as great a variety of crops on a farm as can be advantageously worked—so that if the season should prove unpropitious to one or more, it may not necessarily be so to others. 2d. It is said to stand drought better than almost any other staple, and it cannot be destroyed by chinch bugs—of which we stand in wholesome dread from the remembrance of their fearfully destructive ravages in some summers past to both wheat and corn. 3d. It is a great incentive to taking care of, and hauling out every spring, a supply of manure equal to the task of making rich an indefinite number of acres—indefinite, because the number must be adjusted in all cases to the amount of force employed in the culture. 4th. Because we believe wheat and clover both come better after it than they do after any other crop. 5th. It affords profitable employment to the laborers of the farm in weather unsuited for any other profitable occupation. Thus much *in favor* of cultivating the weed. Let us now say a word in relation to the *errors* in its cultivation, which are apt to be common to all beginners. 1st. Too much land is put in tobacco. The difficulty thus put in the way of the novice, is not apparent until about the time of harvest (the early cultivation very much resembling that of corn, in ploughing, siding, &c.) then, when worms are numerous, and the crop requires the most vigilant attention, the incapacity of hands who are not accustomed to the plant, becomes painfully manifest. Farm laborers who are experienced in tobacco culture, can do double the work in "worming" and "suckering," that the best manager can get out of "green hands," to say nothing of their greater dexterity and skill in handling, stripping, packing, &c., after the crop is made. We would therefore advise our friends who are about to begin growing tobacco, to undertake a small patch only, for the first year, in order that their employees may get somewhat accustomed to the work before them. We do this, because *we have paid for our experience*, "through the nose," and would like to guard them from a similar fate. We would rather have the tobacco from two acres, which had been entirely free from worms, and thoroughly "handled," than that from six acres if badly worm eaten, and unskilfully managed; and believe that the former would bring more money in market. For a beginner, we would advise *less than an acre* as the allotment to each unexperienced hand, in "pitching the crop." 2d. So much time and attention are necessary for the proper care of the crop, that little is left for fencing, and other improvements about the farm. It is useless for us to enlarge on the points, or to add any thing to the "trouble" side of the account, as a full discussion of all the "*pros* and *cons*" of the subject, is already begun in our columns, between two gentlemen of experience and ability. To their essays, we advise our readers to give a careful perusal. We will, however, copy from the *American Farmer*, the following sensible hints:

"SHALL WE GROW MORE TOBACCO?

"There is a great disposition at this time, we find, in sections where tobacco growing has been heretofore unknown, and among persons entirely unacquainted with its culture and management, to undertake the cultivation of the crop.

"Our advice has been sought, as to the policy of doing so, and a few words on the subject may not be useless to a number of our readers.

"In the first place, let us say, then, that the profits of tobacco culture have been very much exaggerated by the publication of prices obtained, within the two years past, for very extra small parcels. These reported prices are no indication at all of the general market. Nevertheless, it is true that the prices of 1857 were very remunerating, and the prices of the past year, though much smaller, were very fair. In consequence of these prices, the culture has already been very much increased, without a corresponding increase in consumption, and the stimulus given to the production of the crop all

over the country, it is easy to foresee, will result, in a few years, in very low prices.

"It is very bad policy generally, an account of the failure for a year or two of any staple, or temporary depression of price, to change one's plans. The best rule is, to hold on steadily and diligently to whatever crops you have prudently determined upon, and wait patiently for a favorable change. It is no argument that the crop of wheat will fail next year, because it failed last year, and the very inclination so common now to abandon wheat or corn, in a measure, and adopt tobacco, is tending at once to raise the price of the former, and depress the latter. So that the new tobacco planter, by the time he gets his houses built, and himself and his farm hands sufficiently familiar with a crop which requires much experience to manage to advantage, may find the price again at a very low figure.

"Tobacco culture while it is not so directly exhausting to the land as is generally represented, so engrosses the labor of the farm as to interfere seriously with improvement. We recommend its culture, therefore, only to those, whose farms, fences, &c., may be in good condition, and who may have labor at command to which they cannot give otherwise profitable employment.

"In connection with our own remarks we give the following from an intelligent correspondent, in one of the Southern counties of Maryland:

"'I do not think it judicious to advise any one to enter into its cultivation, except in a small way, as from my present information, there are so many going at it another year, if there should be a large crop, the prices will be likely to decline to something like they were in '46 and '47, when I sold tobacco for $2.50 per hundred (*average.*) I do not consider it a paying crop at a less average than $6, and that has been about the average price obtained this year in our neighborhood. I think I shall continue to make small crops of it hereafter, but it is only because of the fear of failure in wheat, in which case tobacco may "help the *lame dog* over the stile." I started into an exclusive grain culture, 4 years ago, with the conviction that tobacco had well nigh ruined our section, and would ultimately do it, if persevered in. This conviction is still impressed upon me, if its cultivation is continued under the old *three* field system, where the same piece of land in its rotation is put into tobacco with all the manure that can be raked and scraped from all sources of the farm, without giving a particle to the poor corn knolls and barren flats.'"

We intended to make some remarks on the preparation of "Plant Beds," but we find in the columns of our worthy neighbour, the *Southern Farmer*, (published at Petersburg,) an excellent article on this branch of the subject. We refer our readers also to the article from our esteemed correspondent, published in our December number, under the head "Tobacco." From these two, can be derived all necessary instruction for the proper preparation of their plant beds.

We will only add that we prepared last season a large bed, by ploughing it thoroughly with a "jumping coalter," instead of the more usual way of chopping them with hoes. We had a plenty of plants on this bed, and found the "coalter" more expeditious, and less troublesome than the hoe.

Will some of our readers who have tried the plan of raising plants by using guano *without any previous burning of the beds*, give us their experience in time for our March number.

PREPARATION AND TREATMENT OF TOBACCO PLANT BEDS.

Messrs. Editors:—In the *Farmer* of November 20th, there is a communication on Tobacco Beds, by "B," of Amelia county—some of the positions of which I can by no means assent to—being directly opposite to my experience. His experience is, "that as a general thing it is not safe to top-dress with stable manure." My experience is that it is not only safe, but highly advantageous; and this opinion of mine is corroborated by the experience of some of the best tobacco makers around me—and hence I will state how and when I apply the stable manure.

Early in the winter I take out of my stable some manure that is free of trash, and put it on a plank floor where it can get *thoroughly dry;* when it gets so, it is then forced through a guano sieve, very little rubbing being necessary. I will here state that I never cover my beds with any kind of brush, but before the plants appear, I give the beds a good coating of this *dry, fine manure;* this operation is repeated in a few days after the plants make their appearance, and then once or twice afterwards; never passing over any spot, however bare of plants; as experience and observation have taught me that the coating of manure will, in most cases, cause the seed to germinate where they had not done so before. Where the manure is *dry and fine*, you may cover the plants up entirely, without the least risk of injury.

I find that *dry, fine stable manure* weighs eleven pounds per bushel; and I have, the last spring, applied as much as four bushels to one hundred square yards—which would be forty-four pounds to that space. One bushel (eleven pounds) at a time, gives a very good dressing; but I have applied at one operation as much as one bushel and three quarters; that would cover plants entirely up, if they were small.

If the fly attacks my plants, I apply a very thick coating of this *dry, fine stable manure;* for my opinion is, that if any thing will drive them away, this thick coating of manure will. Let the manure be *dry and fine*, and then watch the beds closely; a plant bed needs *nursing;* if the farmer does not do this himself, there must be a trusty person to do so in his stead. Do not give it up to Tom, Dick and Harry. I am not opposed to top-dressing with guano, but do so after the

plants get to a tolerable size—for instance, in the last two or three weeks before planting.

As yet I have said nothing respecting my mode of preparing plant beds; and as it differs very widely from the plan in common use, I will here state what it is. If I take a piece of fresh ground, (I prefer standing beds,) I apply axes and grubbing hoes, until all roots are taken out. I then apply the new-ground coulter, working it as deep as I can; and after getting off what roots had been left, I cross-coulter; this time forcing it up to the beam. I then hoe it as fine as I can with grubbing hoes, and next with broad hoes until I get it to a fine tilth, after every operation, getting off as closely as possible all roots; then rake it over, getting it quite smooth.

The bed is now ready for the guano. I apply it at the rates of about four hundred pounds to the acre; hoe it in deep with broad hoes, and then rake over nicely. I next cut with the grubbing hoe small trenches, running across the bed, and some ten feet apart, and nearer than this if the ground is any way sobby; then sow the seed and pat the ground with the foot. No matter how many of these small trenches there are, no ground is lost; for they are made before the seed are sown, and of course the sides and bottom have as many seed sown over them as any other equal space of ground.

My preparation of standing beds is nearly the the same as above. I *coalter very deep*, and use grubbing hoes and broad hoes until a fine tilth is obtained; *deep and thorough working* is needed. About the first of August I cut off close every thing that is on the bed, and cover it over to the depth of five or six inches with leaves, which are removed a few days before burning. About three years ago there appeared in the *Farmer* a communication on plant beds, from which I drew some valuable lessons, worth far more to me than the subscription price of your paper during my life time; and hence I have thought that as I was geatly benefitted by a brother farmer, it was my duty to try to benefit some other one.

S.

Louisa Co., Va., Dec. 1st,, 1858.

Acknowledgments.

MATHEMATICAL MONTHLY.

We have received from J. W. Randolph, Esq., No. 121 Main Street, Richmond, the two first numbers of the above periodical, published at Cambridge, Massachusetts, by John Bartlett, and edited by J. D. Runkle. Price $3 per annum.

A paper specially devoted to the science of mathematics is a decided advance in the line of progress, and another evidence of high estimation of the power of the press. The object of this Journal is not simply "*the advancement of the science*"—which would circumscribe its interest, and limit its circulation to a few professed mathematicians and savans, but also "*the elevation of the standard of mathematical learning*" by a "sufficiently comprehensive and elastic scope, to embrace all grades of talent and attainment—including students in one extreme, professed mathematicians in the other, and necessarily embracing all intermediate grades of teachers and labourers in this vast field"—thus enlarging the sphere of its usefulness and commending it to a more general acceptation.

It will be readily perceived that a well-conducted journal occupying ground of such breadth and extent, cannot fail to advance the intelligence of the country, by enlarging the area of popular knowledge, as well as greatly aid the intuition of common sense by affording simple explanations of the general laws applicable to a thousand things, rendered familiar by their use in the every-day business of life, the principles of whose utility are, to an undesirable extent, unknown to popular intelligence.

Believing, with the Editor, "that a Journal of this character in which all interests shall blend and co-operate is needed 'that it will occupy ground unoccupied by other periodicals,' and will be of great importance in advancing the intellectual character of our country," we cannot but recommend it to the patronage of our readers.

We extract from the first number the following suggestive article:

"NOTE ON EQUATION OF PAYMENTS—BY G. P. BOND.

"The time at which two or more accounts, bearing interest from different dates, may be settled by a single payment of a sum equal to the total amount of all the debts, is found, according to the rule commonly used, in the following way:

"*Multiply each debt by the time that must intervene before it becomes due, and divide the sum of the products by the sum of the debts. The quotient will be the interval of time required.*

"If we wish to find the distance of the centre of gravity of a number of weights suspended on a straight rod, measured from a given point in the rod, we *multiply each weight by its distance from this point, and divide the sum of the products by the sum of the weights. The quotient will be the distance required.*

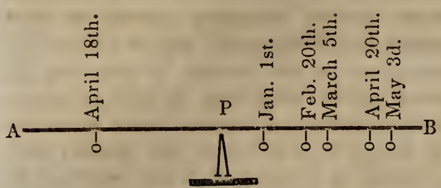
"The analogy between the two processes suggest an easy mechanical method of computing the equation of payments, which we will illustrate by an example.

"A merchant owes the following sums, and requires to know the time at which, by a single payment equal to the sum of the several

debts, all the accounts will be settled with interest.

	Debts.	Bearing Interest from
	$500	Jan. 1,
	260	Feb. 20,
	110	March 5,
	50	April 20,
	5000	May 3.
Total,	5920	

"In the annexed figure, A B is a bar of wood or metal balanced at P, and graduated with equal divisions to the months and days of one or more years, on each side of P.



"At the graduation corresponding to Jan. 1st is hung a weight representing $500, at the date Feb. 20th another of $260, and so on, representing each sum by a proportional weight suspended from the bar at the proper dates. On the opposite side of P is hung a weight equal to the sum of all the other weights. The date (in this example, April 18th,) at which it must be placed in order to restore the balance of the bar, is the time when the payment of the total sum of $5920 will discharge all debts with interest.

"The chief difficulty with the apparatus is to apportion the weights, but no great nicety will be needed, especially as fractional parts of a day and the difference between discount and interest paid in advance, are commonly disregarded in such settlements.

THE VIRGINIA FARM JOURNAL.

M. S. Crockett, Editor. Published in this city weekly, at $2 per annum.

We have received the three first numbers of this well-conducted paper. We find our neighbour Crockett like his former namesake, the gallant Colonel, is one of the "go ahead" stamp, and that he will be an earnest, faithful, industrious workman in his new enterprise. We wish him the most abundant success.

As he says "there can be no jealousy between us," we expect to find in him a most efficient ally: a neighbour with whom we can march "shoulder to shoulder" in our efforts to speed the progress of the good cause which we have both espoused, and to which we would alike dedicate our best endeavours.

Every farmer in Virginia ought to take the Farm Journal, and the Southern Planter too. We cordially invite them to do so.

THE GARDNER'S MONTHLY AND HORTICULTURAL ADVERTISER.

We have received, and shall be happy to place on our exchange list, this instructing and handsome paper, "devoted to Horticulture, Arboriculture, Botany and Rural Affairs. Published at No. 23 Sixth street, Philadelphia. Thomas Meehan, Editor. Price $1 per annum. It is a paper which every gardner should have. We wish it success.

GENESEE FARMER.

The January number of this long established and valuable Journal comes to us replete with a rich variety of practical agricultural matter—adapted to the wants of its readers in all their diversified pursuits, as may be learned from the following list of Prize Essays which, besides other interesting matter and editorials, grace its pages:

"GENESEE FARMER PRIZE ESSAYS.

Farming as a Vocation.
Sociality among Farmers.
Plan of a side-hill Barn for Cattle, Horses, and Sheep.
Preserving Roots for winter use.
How should we improve our Highways?
Rail vs. Board Fences.
Construction of Stone Walls.
A portable Fence, not patented.
Fattening Sheep in winter.
Management of fine-wool Sheep.
Management of coarse-wool or motton Sheep.
Fine vs. coarse-wooled Sheep.
On the most economical way of Wintering Horses.
On the advantages and disadvantages of Grain Drills.
Advantages and disadvantages of Drilling wheat and other grains.
Wheat farms for Dairy purposes.
Cultivation of winter Barley.
Rye and its cultivation.
Is Corn a more profitable Crop than Barley in Western N. York?
Corn-stalks—cutting, curing and feeding.
Clover Seed.
Applying Manure to Corn and Potatoes.
On the use of burnt Clay as manure.
The value of Lime as manure.
The benefits and the best mode of applying shell and other Marls.
Improving permanent Grass lands.
Is Stock-growing to be recommended in place of raising Grain?
Raising Pumpkins.
Earliest and best mode of raising Tobacco Plants.
Climate, soil, &c., of Missouri.
Can Corn fed to Hogs be made to pay East of Ohio?
Management of Bees.
Farm Book.

Will it pay to keep Poultry in large numbers?
Should the Suckers be removed from Corn?
How can Hens best be kept so as to procure Eggs in winter?
Grafting old Apple Orchards.
Cultivation of Lima Beans.
Pruning the Vine—when and how.
Raising Melons with the use of Hot-beds.
On the advantage of Sewing Machines in Farmers' families.
On the Management of Canaries and other Birds in the house.
Cheese-making from a small Dairy.
Bread-making.
Butter-making.
Dressing Poultry for Market."

The Family Journal.

A weekly paper, devoted to Literature, News, Romance, Science and Art. John B. Williams, Charles H. Moore, Editors and Proprietors.

Terms invariably in advance.

One copy one year,	. . .	$2
Four copies	" . . .	7
Ten "	" . . .	15

Address Williams & Moore, *Baltimore, Md.*

It is tastily gotten up, conformable in its matter with the prescribed scope of its prospectus, and worthy of a place among the polite literature, which contributes so much to the enjoyment of the refined family circle.

The Horticultural Monthly.

A Journal of Rural Affairs, published at Morrisania, N. Y., of 16 pages quarto, at 50 cents per annum. Edited by William H. Willcox.

It is embellished with handsome wood cuts illustrative of the picturesque in landscape gardening; of symmetry and beauty in rural architecture, &c., &c.

From the first able number now before us, we have the promise of interesting and profitable instruction from month to month through the pages of this paper, and at a price so low as to bring it within the reach of everybody who desires information on any of the departments of ornamental or kitchen gardening.

Michigan Farmer. Indiana Farmer.

We have received the first number of the weekly issues of the above papers. We are happy to see such evidence of progress in the North-west, as is indicated by a demand for agricultural weeklies, in addition to the existing monthlies. The Editors respectively have our best wishes for the complete success of their enterprizes.

The Weekly Southern Guardian,

As its name imports, is devoted to the interests of the South. It is published at Columbia, S. C., at two dollars per annum; and, as a fair proportion of its space is appropriated to the subject of Agriculture, it strengthens thereby its claims as a newspaper upon the patronage of the Farmer.

The Southern Cultivator,

Is among the most able and efficient Agricultural papers of this country. It is published at Augusta, Ga., for one dollar per annum, and edited by Dr. Lee and D. Redmond.

The Wisconsin Farmer for December and January has not come to hand. We had promised ourselves much pleasure in their perusal, and should hail their advent *as a visit from a friend.* We hope friend Hoyt has not forgotten us.

DeBow's Review:

We have not been favoured with the receipt of a number of this valuable paper since September. We cannot at all afford to do without it.

The South Countryman.

We have before us the first number of a new paper, under the above title,—a monthly Agricultural, Industrial, and Educational Magazine. Edited by C. W. Howard, and published by W. H. Hunt, Marietta, Ga., 32 pages large octavo, at $1 per annum.

It is ornamented with a bust of General Oglethorpe, the founder of Georgia, and is neatly printed and well edited. We heartily wish it abundant success.

The Democratic Age.

A monthly, devoted to Statesmanship, Science, Art, Literature, and Progress. Price two dollars and fifty cents a year in advance. C. Edwards Lester, Editor. New York: Edwards & Co. Printers. We welcome it to a place on our exchange list.

We have received J. M. Thorburn & Co.'s Descriptive Catalogue of Vegetable and Agricultural Seeds, &c.—Garden, Field, Fruit, &c., Seeds. Embracing every standard and improved variety. Also Tested Novelties, both of Domestic and some of European origin, suited to the climate of the United States. 1859. No. 15 John St., New York.

We are indebted to Messrs. Bridgeman for their Descriptive Catalogue of Fruit and Ornamental Trees, Shrubs, Vines, &c., cultivated at their Nursery and Greenhouses, Astoria, and sold at Bridgeman's Horticultural Establishment. Nos. 876 and 878 Broadway, N. Y.

Our Agents.

The following gentlemen have kindly consented to act as our agents, and are authorized to give receipts in our names for payments due the "SOUTHERN PLANTER," by either old or new subscribers:

JNO. W. BURKE, Alexandria, Va.
MAJOR P. WILLIAMS, Washington City, D. C.
WM. F. CATLETT, Guiney's Depot, Va.
TURNER & ACREE, Walkerton, K. & Q., Va.
JOHN T. CHILDREY, Henrico.
JAMES N. GOLDSBOROUGH, Easton, Md.
GEO. C. REID, Norfolk.
BENJ. F. GRESHAM, Newtown, K. & Q., Va.
F. N. WATKINS, (at the Farmers' Bank,) Farmville, Va.

Marl.

We received a letter from a gentlemen in North Carolina, (which we unfortunately mislaid,) making inquiries on the subject of marling, and expressing great pleasure in the perusal of the articles of Wm. D. Gresham, Esq., and "Tide-Water Farmer," lately published in the "PLANTER." Our correspondent will find the information he wishes in the essay on "Calcareous Manures," by Mr. Edmund Ruffin, which can be procured at the Book Stores.

We have received from "Nicot" a communication on Tobacco, which we regret was not received earlier. It will appear in our March number, that for February being full. We return our thanks for it, while we rejoice that the subject is calling forth a full discussion.

For *ourselves*, we are going to try a crop every year, for years to come, if we live, and at all events hope by this course to *get back* our outlay for houses, &c., and to have some pretty clover lots, on the sites selected for the weed first to grow.

We shall be much interested in the discussion, and will lend a ready ear to both sides.

Fine Hogs.

We call attention to the advertisement of our friend, Mr. F. G. Ruffin, of his Improved Breed of Swine, which may be found in our advertising sheet.

We have frequently visited his farm, and seen his "Stock" of every kind. Of swine, he has some six or eight fine breeding sows of his own raising, white in color, and characterized by length of body, early maturity, good size, and a disposition to fatten readily. Also, some Essex and Berkshire Hogs.

The "Berkshire" Boar, we speak for, whenever his time may come to be "rotated out," to make room for his successor.

"Napier."

We regret to hear of the death of this distinguished Cleveland Bay Stallion, the property of our public-spirited friend, Dr. John R. Woods of Albemarle county, Va.

Napier was the winner of a good many prizes in England, as the best of his class, and was purchased by Dr. Woods at a high price, for importation to this country. He died a few days after being shipped.

The Dr. has "Havelock," an imported Cleveland Bay, at his farm near Ivy Depot, but we regard the death of Napier as not only a loss to him, but to all the lovers of fine stock.

Fine Arts.

MR. E. TROYE, ARTIST.—This gentleman has recently been in our vicinity, and we are happy to add, has left some most beautiful specimens of his skill as an artist, in our city. He has painted the portrait of the Messrs. Doswell's fine horses, "Planet," "Fanny Washington," "Nina," &c. Also H. J. Smith's "Kossuth," and Colonel Cocke's "Cleveland."

The pictures are true to life, and we would advise our friends who have not already enjoyed the pleasure of seeing them, to get a look at them. They may be found at the store of Geo. M. West, No. 145 Main street, or at the Agricultural Office.

Rhodes' Super-Phosphate.

The Charleston (S. C.) *Evening News* publishes the following extract from the report to the So. Carolina Agricultural Society, from the committee appointed on chemicals, minerals, &c., for the information of those who may feel an interest in the subject:

Extract from the Report of Exhibition of the South Carolina Agricultural Society, held at Columbia 9th, 10th, 11th and 12th November, 1858.

The Committee on Chemicals, Minerals, &c., beg leave to make the following report:

The Committee would call the attention of the Society to Rhodes' Super-Phosphate of Lime.—Experience has proven it to be a valuable fertilizer—said to be superior to Guano.

For the Southern Planter.

Preservation of Sweet Potatoes.

Mr. Editor—Your readers, who, like myself, are sweet potato growers, are indebted to Mr. J. Lucius Davis for his article published in your December number. Mr. D. has certainly given us a sure mode of preservation of that valuable esculent. Our regret is that it is not adapted to crops of 500 or 1000 bushels without considerable cost in the construction of cellars and shelves. With due deference to the opinion of Mr. D., our experience would lead to the belief that pressure is not the cause of the rotting of the potato in bulk—but too high a heat generated in the *sweating process* as we call it. The fact that in a bulk of potatoes the bottom is always in a better state of preservation than the top (as our growers assert) would go to prove that pressure is not the cause of the destruction, Mr. D.'s mode prevents the generation of much heat, and is truly a perfect way of preservation adapted to quantities not very large. We fear an economical plan of storing a large quantity of the sweet potato with certainty of preservation from both warm and cold weather is yet a desideratum. A premium on this head from our Agricultural Society might encourage experiment which perhaps would throw light on this important subject.

There is a point connected with the growing the sweet potato as a crop, which is a mystery to us, the uninitiated in vegetable chemistry. It is well known to our growers that a succession of four or five crops (even if the land is yearly supplied with a liberal quantity of the usual manure) reduces the soil to a condition unfit for the growth of the vine or the formation of tubers. The soil is yet in a state of fertility capable of producing a fair crop of corn, oats, &c. It would appear then that the cultivation successively of the potato has removed from the soil some element necessary for its growth and formation.

You will confer a lasting benefit, if by reference to your agricultural science you can tell us what manure or what rotation of crops we must resort to, to bring these lands to the potato bearing state again. G. G. M.

New Kent, Dec. 21, 1858.

Will some of our subscribers furnish us with an analysis of the sweet potato, if they can.

We have not been able to find such a thing. A gentleman of this county informs us that he has seen sweet potatoes raised on the same piece of ground, year after year, by manuring highly, and has promised to write an article for the "Planter," giving his views and plan of cultivation. We shall be glad to hear from our Nansemond friends also on this subject.

For the Southern Planter.

Information Wanted.

Danville, Va., Nov. 21, 1858.

Mr. Editor—Will you or some of your correspondents who have had experience, inform me how to apply spoilt herrings as a manure to corn or tobacco. We have a lot of them we want to use on our crop next year, and as we have had no experience in their use, any information upon the subject will be thankfully received by a subscriber. Very respectfully,

WM. P. GRAVES.

Will some of our subscribers who have tried fish as an article of manure reply to the above request, and thereby oblige not only Mr. Graves, but ourselves.

In the *Southern Planter* for October, will be found on page 622, an analysis of fish and some other refuse articles used as manure, copied from the "Transactions of the Highland Society."

Virginia State Agricultural Society.

BRANCH II.

In our December number, our readers were informed of the reason why no report accompanied the other reports of Premiums then published, on the subject of Essays. That report has since been furnished, and is as follows:

Premiums on Written Communications.

The committee on Branch II, not having had opportunity to examine the various communications submitted to them, in time to justify a report upon them, at the last fair of the Virginia State Agricultural Society, determined to defer doing so until they could, by careful consideration and comparison, do justice to their merits in rendering their awards. They now respectfully report, that they have awarded the following premiums:

To Professor William Gilliam for his Communication "on the Occurrence of the Phosphates in some of the Tertiary Deposits of Virginia." $50 00

To William M. Tate, Esq., of Augusta, for his Essay "on the Cultivation of Indian Corn, on the Clay Soils in the Valley of Virginia." 20 00

To Willoughby Newton, Esq., of Westmoreland, for his communication "on the Use of Compost Manures, in Seeding Wheat with the Drill; and on Draining Basins on Table Lands, by Boring with the Post-hole Auger." 20 00

J. Ravenscroft Jones,
Richard Irby,
Wm. B. Price.
} *Committee.*

Jan. 8, 1859.

From the British Farmers' Magazine.

Stock-Feeding.

NO. I.

In entering upon this subject, which extends into various sections of practical sci-

ence, it may be well to take each division in turn, and afterwards sum up the evidence.

There are, in the first place, evidently two grand divisions of the subject; viz: the animals of which it is proposed to increase the flesh; and the vegetable food, which it is the object of the stock-feeder to transmute into flesh, by introducing it into the stomachs of the animals.

As the feeding of stock, and not the breeding, or pointing out their various qualities, is the subject of these articles, particular allusion to the cattle will be unnecessary, as the treatment which will produce any desired effect upon one animal will have, generally at least, a like tendency with another—that is, the best means for fattening one will be the best for fattening another, and the best thing for increasing the yield of milk from one will also be the best for producing a similar result with another, under similar circumstances. Not that it is reasonable to expect that any one kind of food or treatment will produce indiscriminately various or opposite results, and *in this article the present mode of fattening only will be considered.*

The inquiry will, therefore, be commenced with the food itself, showing of what it really consists, and what becomes of it when consumed by the animals.

Vegetables will increase in weight many fold when growing, without abstracting much weight from the soil, as they derive almost their entire bulk, directly or indirectly, from the atmosphere; which is in some degree owing to their containing in their substance, and absorbing from the soil, very small quantities of salts, &c., which, having an affinity for the gases, fix or consolidate them.

It may be needful to premise, that the elementary bodies, as oxygen, carbon, hydrogen, nitrogen, &c., (of which, except a few salts, of very small amount, all vegetable food is entirely composed,) are substances which have never been decomposed, and are presumed to be utterly incapable of being so; for though they may be changed from solid to liquid or even to vapour, they are still identical; thus sulphur may be solid, liquid, vapour, or combine to form acid, and the acid again—with, for instance, lime—form gypsum. But still it exists as sulphur, and may be again recovered, as under no circumstances can either it or any other substance be annihilated.

Yet, one of the earliest impressions in connexion with stock feeding, which strikes the mind of any one who really thinks for himself, is the very small increase of an animal, compared with the large quantity of food taken into its system, and that the balance or loss is not represented by the weight of manure. If we take the following table by Dr. Playfair, given in the 6th vol. of the *Royal Agricultural Society's Journal*, as being the amount of various foods necessary for producing one pound of flesh; viz:

100 lbs. turnips,	9 lbs. oatmeal,
50 " potatoes,	7.1 " barleymeal,
50 " carrots,	7.4 " bread,

4 lbs. lean meat,
3½ " peas,
3.3 " beans.

Where does the balance go? Even the flesh, which is almost identical with the product required, is shown to be reduced to one-fourth. Although there is a large quantity of water in the roots, and some also in the meals, it must be remembered that the "pound of flesh" produced, too, is in a moist state.

By drying some of the usual food until every particle of water is evaporated, and noting the proportion of loss in weight, from this may be calculated what would be the weight, when dry, of any quantity of the same kind of food; and experiment will prove that the total weight of flesh added and manure made (both also dry) will not nearly amount to the weight, when dry, of the food given to the cattle.

Though it is quite certain that elements cannot be annihilated, it is equally clear that they have here been lost to the feeder. There are in vegetables the necessary elements of which, when mixed with the air by respiration, to make flesh; and it is only ordinary prudence to prevent, as far as possible, their loss or escape during the process; yet out of say 100 lbs. of vegetable carbon, only a small proportion is usually transmuted into animal carbon. But if one portion of the 100 lbs. will undergo this change, why should not another portion, or, in short, every other portion, of the whole 100 lbs.? There is only one kind of carbon; it is not capable of being annihilated—it is merely required to change its combinations; and certainly there ought not to be so great a loss in merely, as it were, pouring it from one vessel into another.

The proportions of food wasted and as-

similated are purposely left somewhat indefinite; for if the fact of their being a great and unnecessary waste is made evident, the object of the present article is attained, as it is more desirable to point out precisely the source of the loss, and that it may be prevented, than to be critically exact about the amount. In fact, none of the elaborate statements in reference to nutritive properties of various foods, even though made by Sir This, or Professor That, as being the actual result of most careful, and perhaps curious experiments, published by societies or associations rejoicing in the most dignified titles, are any better, for practical purposes, than the observations of sensible persons of less pretension. In practice the results vary: the roots or grain may or may not be in equally dry condition, and different animals have different qualities for "putting up flesh," or the same animal may vary at different times, &c.; consequently, any statement which descended to the utmost nicety would be less useful than another, which although not so correct in detail, examined the subject on broad principles. And as it is now purposed to show how a very large amount of the really available dry elements of food is totally lost, fine calculations are perfectly unnecessary.

Vegetables consist of water, a quantity of matter called gum, sugar, starch, lignine, albumen, and gluten, according as it assumes various appearances, and also of a small quantity of salts, &c., the latter not amounting to more than about 1-500th part of the whole, and of these salts, &c., no notice will be taken at present, nor *until it has been first demonstrated that to the small constituent portions of food are we chiefly indebted for the continuance of life itself.*

The following table will show the proportions of water and soluble solid matter in a few articles as examples, and also of starch, sugar, gluten, &c., in 1,000 parts of the soluble solid matter:

Article.	Water.	Soluble solid Matter.	Mucilage or Starch.	Sugar.	Gluten or Albumen.
Barley	80	920	790	70	60
Oats	257	743	641	15	87
Potatoes	770	230	180	15	35
Carrots	902	98	3	95	0
Turnips	936	64	9	51	2
Clover	968	32	29	1	2

The most obvious difference is in the proportion of water; but neither that nor the varying amounts of starch, sugar, gluten, &c., account for the well known different values for feeding purposes, but which these articles will gradually trace to their true cause.

As for the starch, sugar, gum, &c., the subjoined table will show that they are all nearly alike, or only vary slightly in their composition, and therefore the proportions of these substances contained in any kind of food are not so important as frequently has been represented:

	Carbon	Oxygen	Hydrogen	Nitrogen
Gum	42.23	50.84	6.93	0
Sugar	42.27	50.63	6.90	0
Starch	43.55	49.68	6.77	0
Lignine	52.0	41.25	5.75	0
Albumen	52.8	23.8	7.5	15.7
Gluten	55.7	22.0	7.8	14.5

Before proceeding, it may be necessary to explain that water exists in two states in food as used, viz: One in which it may be driven off by submitting the food for a sufficient length of time to a temperature equal to boiling water until it has evaporated. The other, in its elementary state as oxygen and hydrogen, as shewn in the table; but whether they are in combination or not is not very clear, nor does it particularly signify, as they occupy about the same compass, and are not in the expanded gaseous form.

By deducting from the figures in the above table the exact amounts of hydrogen necessary to combine with *all* the oxygen to represent the proportions existing in water, there is found a slight excess of hydrogen in each instance. In the cases of the albumen and gluten, there must also be deducted the hydrogen and nitrogen in the proportion to form ammonia; and here again there is still a small excess of hydrogen. *But of this small excess hereafter.*

1. The object is now to show the weighty loss of carbon. With the exception of carbon, all the rest of the food has been shown to consist entirely of water and its elements, and the elements of ammonia, with a slight excess of hydrogen, and a few salts, &c., of no great bulk. Therefore *carbon is the only available bulky matter* contained in the solid part of vegetables, be it termed gum, sugar, starch, lignine, albumen, or gluten; for, in the animal, the oxygen and hydrogen pass off as water. And having now traced

out only the bulky disposable element, it will be shown what becomes of it.

Carbon and oxygen have a great affinity for each other, and combine in certain proportions to form carbonic-acid gas, which is elastic, and like all other gases, is volatile, unless there be present something for which it has an affinity, and with which it will combine, and become what is termed fixed.

After its introduction into the stomach of the animal, to use the language of Professor Liebig, "it signifies nothing what intermediate forms food may assume, or what changes it may undergo in the body: the last change is, uniformly, the conversion of its carbon into carbonic acid." The carbon contained in the food is introduced through the gullet into the stomach, and the oxygen contained in the air by respiration through tho wind-pipe into the lungs; and eventually they come in contact, form into carbonic acid, and are both removed from the system at every respiration and by every pore. The oxygen is, as a thief, allowed to come in and steal the carbon which the stock-feeder has expended large sums of money to obtain. But if a hare, or other similar depredator, had come into his fields, to rob him of the carbon contained in his crops, he would, probably, have made food of it, and been richer, for having both saved his carbon, and detaining the thief which came to steal it. *So it should be with detaining the oxygen; but of this hereafter.* As the combination of carbon and oxygen takes place in regular and definite proportions, and as the lungs of an animal, under similar circumstances as to exercise, &c., inhale a regular quantity of oxygen, it is also evident that to just saturate or satisfy this oxygen, a certain regular quantity of carbon is required; and it is exactly this amount, which is contained in the food, that is found to keep an animal in a stand-still condition, neither adding to its flesh, nor losing it; *and no carbon can be deposited* (leaving out the action of the small quantity of salts, &c., in the food) *unless a larger quantity is put into the system than there is oxygen taken in to combine with it*, or, in other words, more than the thief can carry away.

It is freely admitted that animals will, and do actually improve in condition, and increase in bulk, by having plenty of good food given to them. So a person may fill a tub with water, though it may leak on every side, if he puts the water into it faster than it runs out of it; but he would do so much sooner, and with less waste of water, by adopting some plan for preventing the leakage. At present our stock feeders might be represented as the Daniades, who were doomed to collect water in buckets full of holes.

The real question is this: Do animals retain all the nutriment contained in a certain amount of food, which it is possible they can be enabled to retain? or is it not true, that out of a certain quantity of food given, a large portion neither shows itself as flesh nor manure, but is lost as gas? This matter has never been properly attended to, and the "agricultural mind" has been so busy with improving the breeds of cattle, that it has not had time to see after the best mode of feeding them.

No doubt there are now greatly improved specimens of stock, which will feed in shorter time and with less expense than could formerly be done; but this is, after all, comparatively a small improvement, for they still absolutely waste and dissipate a large proportion of the dry weight of all their food; and the chief variation from ordinary stock will probably be found to consist in those which are the most rapid feeders, having proportionally the smallest lungs, consequently inhaling a smaller quantity of oxygen, to rob them of the carbon they have eaten. They are, practically, owing to the small size of their lungs, even without restraining their exercise, (in which they would not be disposed to exceed,) placed about on a par with the larger-lunged cattle when "tied up" and restrained from taking exercise, or, to speak more to the point, when prevented from inhaling so much oxygen as they otherwise would.

Such cattle are, however, in a low state of vitality, and very subject to disease, and even sudden death; for, not having in their composition that which would retain, by affinity, a good, firm hold on the mass of carbonaceous matter which they have accumulated, merely because of the smallness of their lungs, and their substance being as it were *deposited*, or, at most, held together by *very slight affinity*, they are liable to sudden decompositions, which totally disorganize their whole animal economy.

To sum up this portion of the subject; it is found that vegetation, which in some form is the food of cattle, has grown to the

state in which it is generally used, by fixing gases from the air, and by absorbing water, (for the present omitting the salts, &c.) It is, therefore, composed of water, and *gases which have been, and may again become volatile.* When vegetables are taken into the animal system, they are decomposed; the water runs off; and *unless there be something present in the body, to absorb and fix the gases, they are volatilized*, and fly away, leaving no increase. It has been stated that the dry weight of food given is not equalled by the dry weight of flesh gained and manure made, and it is thus proved that *a large portion does fly away.*

Yet no pains are usually taken to absorb and fix this gas, which is naturally only fixed in a small degree; because it is the custom for persons to think they do well if they do as well as others, and the feeders of stock are not exempt from this feeling; they do not like to "force" animals, because it is "against nature," &c., when the truth is, that, *to produce further development, it must be produced on exactly the same plan that nature does*—consequently be more in accordance with the laws of nature than the wasteful method now in use. In short, it is helping nature.

Where is science? Where are the chemists? The latter pronounce carbon to be the great constituent both of vegetation and of fat, yet stand aloof whilst pounds of the former are used to produce ounces of the latter. What would be said, and done too, if the coinage was conducted on similar principles, and that a pound of gold only produced an ounce of gold coin? Is it not probable there would be some investigation of the fumes which ascended the chimney of the furnace, and, if it proved that the precious metal was thus carried off, that some endeavour would be made to condense those fumes and recover the gold?

In a future article the means of preventing this extravagant waste will be pointed out; but as it is most desirable to make good the ground already gone over, a week or two will be allowed to elapse, that any objections which may be offered or errors pointed out *in the principles, so far as at present stated,* may be considered, and either refuted or amended.

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From the British Farmers Magazine.

Stock-Feeding.

NO. II.

Having in the last article proved that a large amount of the carbon of food escapes during respiration, it will now be shewn how this carbon can be retained, and in a future article it will be shewn how this, as well as any other portion of the carbon of food, can be converted into flesh.

It may be allowable before proceeding, to advert to a few of the causes which have supported error, and obstructed investigation, of which the following are, perhaps, the chief:

That persons who have been schooled in, and taught to believe, particular doctrines, without even being allowed to investigate them; who have had degrees and honors conferred upon them, and who have long publicly espoused the doctrines thus "crammed" into them, are not, and cannot be expected to be sufficiently free to examine the basis of the theory upon which they have built their reputations, as by so doing they would undermine their own position.

One fallacy thus perpetuated is that of apportioning specific and separate duties to "starch," "sugar amylon," &c., &c., when they are only variations of each other, and are readily convertible from one to another; as for instance, starch becomes sugar during malting, and when food is digested the supposed differences cease to exist. The chief available substance in all cases, as before shewn, is carbon, differing in solubility in proportion to the oxygen with which it is associated—thus sugar is more soluble than starch; starch than lignine, &c.

Another obstacle is the practice of referring to the beautiful ordination by which the balance of nature is restored, by vegetables absorbing carbonic acid gas, and giving out oxygen; and animals absorbing oxygen, and giving out carbonic acid gas. This is generally held forth as a final answer, and intended to arrest all further inquiry. It is, however, worse than foolish to suppose nature's laws can be disturbed, as it pre-supposes a weakness in the Maker of those laws, and leads to the ridiculous idea of an Almighty weakness! showing the absurdity of allowing such doctrines to interfere with legitimate practical inquiry.

It is needful now to refer to the extensively-propagated, and generally-accepted, view

of the purpose of respiration, which is evidently erroneous, viz:

1. That by the combination of carbon in the blood with the oxygen of respiration, animal heat is supported.

2. That the removal of the excess of carbon from the blood is essential to render it fit for circulation.

Now, the union of carbon and oxygen takes place with only a trifling change of volume, and therefore cannot be productive of much heat, heat being only disengaged where combination is attended with a considerable diminution of volume. Animal heat is chiefly supplied by the union of the *hydrogen* of food with the oxygen of respiration, which during combination condenses and forms water.

Then, if the blood does contain an excess of carbon, it is only an *excess in relation to something else.* If it were too large a quantity *per se,* why not abstain from adding more by the food, which consists principally of carbon? It would, however, be more correct to say that there is a *deficiency of some other element or elements in relation to the quantity of carbon,* which is the actual case.

In order to make this more evident, suppose, as it occasionally happens, that a most unusual abundance of fish were caught, where there was not at hand a sufficiency of salt to cure them; would not any sensible person, instead of saying there were too many fish, at once say there was a deficiency of salt? This is exactly the case with the carbon of the blood; but *all salt is not muriate of soda.*

All parts of the animal system are supplied and renewed with substances derived from the blood during its circulation through them—carbon is the main element in the composition of animal substances—consequently it is extremely absurd to suppose there is any advantage attending the abstraction from the blood of the chief element of the flesh.

Food, as generally used, always contains a larger portion of carbon than of salts capable of retaining it when in the body of an animal; and this is the reason of, and is demonstrated by, the *relative excess* combining with oxygen, and escaping as carbonic acid gas.

The obvious remedy is to supply the deficiency of salts having an affinity for this carbonic acid gas, and we have, by the natural conformation of animals, every facility for making such application effectual.

The carbon contained in the blood circulates with it through the lungs, and there, coming in contact with oxygen, is transformed into carbonic acid gas: and it must be evident that if we introduce, through the medium of the food, into the blood, soluble substances having an affinity for carbonic acid gas, and this gas, and consequently the Carbon (which is one of its constituents) WILL BE ABSORBED OR FIXED, AND THUS PREVENTED ESCAPING.

It is admitted that *free* carbonic acid gas is injurious to animals, and must be expelled from the system; but when this gas is *fixed,* it may, on the contrary, be rendered highly beneficial, and the carbon it contains as conducive to the formation of flesh, as any other portion of the carbon of food. It is obvious that before any further process can be commenced with reference to the carbon becoming useful for flesh-making, it must be prevented flying off; on the same principle that Mrs. Glass says, "first catch your hare," before detailing the process of cookery.

The fixation of carbonic acid gas has been attempted by various means, but being deficient in chemical knowledge the parties making the experiments have never yet produced any decidedly beneficial results; for instance, charcoal, ashes, &c., have been used.

Charcoal when fresh will undoubtedly absorb a large quantity of carbonic acid gas; but charcoal itself being carbon, is afterwards converted into carbonic acid gas, and both it and the gas it has previously absorbed escape.

Ashes, when fresh and well burned, contain caustic alkalies which have an affinity for carbonic acid gas; but before they reach the lungs they are liable to corrode parts with which they come in contact; and not only so, but meeting with fat already formed in the animal, they unite with and form it into soap, and thus being rendered soluble it is evacuated and lost. If the ashes, on the contrary, have been long made and exposed to the air, they will have already become saturated with carbonic acid gas, and consequently cannot absorb or fix any more, and are therefore inert, if not injurious.

There are, however, two plans by which the fixation of carbonic acid gas can be certainly and beneficially accomplished.

1. By introducing into the system, along with the ordinary food, a soluble neutral salt, having so feeble an affinity existing between

the acid and the base, that when in contact with carbonic acid gas the base will leave the acid, with which it was at first combined, to unite with the carbonic acid gas. Hence it follows that when such a salt is absorbed during digestion, and conveyed by the blood to the lungs, it will seize the carbonic acid gas there generated. It is, however, imperative that the acid with which the base was at first combined be of a perfectly harmless character, or one that will decompose and resolve itself into its orginal elements (oxygen, hydrogen, and carbon,) which is the case with vegetable acids. This arrangement causes the compound to remain perfectly inert until it comes in contact with the very object we wish to seize, and the presence of that object at once fits it for entering into combination with it.

2. This depends upon similar principles, and is in fact only a slight variation, viz., that in this case the acid must have a greater affinity for elements it will meet with in the lungs than for the base with which it was at first combined; consequently in the lungs it will separate from the alkali, which will then seize the carbonic acid gas. Of course it is here also requisite that all the compounds formed must be harmless, and this can not only be accomplished, but they shall be highly conducive to the health and vigour of the animal.

These are not "theories," for there is large and accumulating evidence of the results obtained by their application. Orthodox professors, having contradicted each other until it has become a proverb that "doctors disagree," may attempt, when the evidence becomes irresistible, to show that they have been for years advocating the principles now being brought forward; but to which, as far as regards cattle-feeding, I lay absolute claim as the sole advocate.

G. H. Bolton,
Warrington. Agricultural Chemist.

Sing at Your Work.

Then, what an antidote it is to misfortune and sorrow. Think of Milton in the blindness, obloquy, poverty, and solitude of his old age. He had nourished, in his youth and early manhood, the power to appreciate what is perfect and excellent. So when his natural vision became darkened, and one by one, the lights of life went out, he had but to summon around him the beautiful and sublime things he had stored away in his chambers of imagery. Imagination, the mighty magician, selected, combined, and glorified all, forming them into a new world, a world infinitely nobler than the one from which he was excluded. There he reigned supreme and happy, though shut out from the light of day, and scorned by men.—Think of Milton's work and song.

To Measure the Contents of a Cistern.

A subscriber asks for some rule for measuring the contents of a cistern which he is building.

Supposing the part of the cistern which contains the water, to be of a circular form, the following rules may be adopted for ascertaining how many wine gallons it will hold.

1. Multiply half the diameter by half the circumference, this will give you the area of the bottom.

2. Multiply this by the height of the cistern in feet. This will give you the solid contents or cubic feet of the cistern.

3. Multiply this by 1728 and you will get the contents in cubic inches.

4. Divide this by 231, the number of inches in a wine gallon, and you get the contents in gallons.

Blasting Stumps.

The *Ohio Cultivator* relates the experience of W. A. Gill, of Columbus, Ohio, in clearing a field of stumps by gunpowder, which really appears to be a most powerful "stump extractor." He cleared a stumpy field of twenty acres cheaply and expeditiously, the following plan being pursued for each stump:

"Select a solid place in a large root, near the ground, and with an inch and a quarter auger, bore in, slanting downward, to as near the heart of the base of the tap-root as you can judge; then put in a charge of one or two ounces of powder, with a safety fuse, and tamp in dry clay or ordinary tamping material, to fill the hole, some six inches above the charge; then touch fire to the fuse, and get out of the way. The blast will usually split the stump into three pieces, and make it hop right out of the ground. If the charge is put in too high up, the blast will only split the top of the stump, without lifting it."

Visions of Childhood.

—At Pentecost, which brings
The spring, clothed like a bride,
When nestling buds unfold their wings,
And bishop's-caps have golden rings,
Musing upon many things,
I sought the woodlands wild.

The green trees whispered low and mild;
It was a sound of joy!
They were my playmates when a child,
And rocked me in their arms so wild!
Still they looked on me and smiled
As if I were a boy;

And ever whispered, mild and low,
"Come, be a child once more!"
And waved their long arms to and fro,
And beckoned solemnly and slow;
O, I could not choose but go
Into the woodlands hoar;

Into the blithe and breathing air,
Into the solemn wood,
Solemn and silent every where!
Nature with folded hands seemed there
Kneeling at her evening prayer!
Like one in prayer I stood.

Before me rose an avenue
Of tall and sombrous pines;
Abroad their fan-like branches grew,
And, where the sunshine darted through,
Spread a vapour soft and blue,
In long and sloping lines.

And, falling on my weary brain,
Like a fast-falling shower,
The dreams of youth come back again;
Low lispings of the summer rain
Dropping on the ripened grain
As once upon the flower.

Visions of childhood stay! O stay!
Ye were so sweet and wild!
And distant voices seemed to say,
"It cannot be! They pass away!
Other themes demand thy lay;
Thou art no more a child!

"The land of song within thee lies,
Watered by living springs;
The lids of Fancy's sleepless eyes
Are gates unto that Paradise,
Holy thoughts, like stars, arise,
Its clouds are angels' wings.

* * * *

"Look, then, into thine heart, and write!
Yes into Life's deep stream!
All forms of sorrow and delight,
All solemn voices of the Night,
That can soothe thee, or affright,
Be these henceforth thy theme."

LONGFELLOW.

"My Father's at the Helm."

The curling waves, with awful roar,
A little boat assailed,
While pallid fear's distracting power
O'er all on board prevailed;

Save one, the captain's darling child,
Who steadfast viewed the storm:
And cheerful, with composure smiled,
At danger's threatening form.

"Sportest thou thus," the seamen cried,
"While terrors overwhelm?"
"Why should I fear," the boy replied,
"*My father's at the Helm.*"

So when our worldly all is reft,
Each earthly helper gone,
We still have one true anchor left—
God helps, and He alone.

He to our prayers will lend an ear,
He gives our pains relief;
He turns to smiles each trembling tear,
To joy each torturing grief.

Then turn to Him, 'mid sorrows wild,
When wants and woes o'erwhelm;
Remembering, like the fearless child,
"Our FATHER'S at the helm."

Labor.

Toil swings the axe, and forests bow;
The seeds break out in radiant bloom;
Rich harvests smile behind the plow,
And cities cluster round the loom;—
Where tottering domes and tapering spires,
Adorn the vale and crown the hill,
Stout Labor lights its beacon fires,
And plumes with smoke the forge and mill,

The monarch oak, the woodland's pride,
Whose trunk is seamed with lightning scars,
Toil launches on the restless tide,
And there unrolls the flag of stars;
The engine with its lungs of flame,
And ribs of brass and joints of steel,
From Labor's plastic fingers came,
With sobbing valve and whirling wheel.

'Tis labor works the magic press,
And turns the crank in hives of toil,
And beckons angels down to bless
Industrious hands on sea and soil.
Here sunbrowned Toil with shining spade,
Links lake to lake with silver ties,
Strung thick with palaces of trade,
And temples towering to the skies.